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1936 to 1940 Charles L. Jamison, Founder, University of Michigan

NOTE: The Academy was organized on an informal basis from 1936 to 1940, and was inactive because of World War II from 1942 to 1946.

Suggestions to Authors

The objectives of the Academy of Management in their most recently revised form are succinctly worded as follows:

"The Academy is founded to foster the search for truth and the general advancement of learning through free discussion and research in the field of management. The interest of the Academy lies in the theory and practice of management, both administrative and operative. . . . It is not concerned with specialized procedures for the control and execution of particular kinds of projects that are significant chiefly in narrow segments of a business field.

"The general objectives of the Academy shall be therefore to foster: (a) a philosophy of management that will make possible an accomplishment of the economic and social objectives of an industrial society with increasing economy and effectiveness: the public's interests must be paramount in any such philosophy, but adequate consideration must be given to the legitimate interests of capital and labor; (b) greater understanding by executive leadership of the requirements for a sound application of the scientific method to the solution of managerial problems, based on such a philosophy; and (c) wider acquaintance and closer co-operation among such persons as are interested in the development of a philosophy and science of management."

It is suggested that, as a general rule, full-length articles contributing to these objectives be approximately 1500 to 3000 words in length. Interested consideration will also be given to shorter, abbreviated notes or ideas relating to specific aspects of management thought, philosophy, theory, techniques of wide applicability, curriculum-building, or teaching. Perhaps one of the more important heuristic functions that this *Journal* can fulfill is that of exchanging specific new insights into challenging management problems. Since what is really new tends to be still in an area of controversy, we shall expect (and hope for) considerable argument. Rebuttals, rejoinders, comments, objections, extensions of a writer's thoughts—all of these will be particularly welcome.

Many of us have specific, detached ideas on various topics, and notes on such topics could be submitted for the consideration of our readers without investing extensive scholarly effort. An important requirement is that manuscripts be written in a straightforward style of English—esoteric writing will find no place in the *Journal of the Academy of Management*. The Academy's Research and Publications Committee has decided against the publication of book reviews.

Manuscripts should ordinarily be double-spaced; however, single-spacing will be accepted if this makes it unnecessary for the author to re-type his article. A single copy of the manuscript will suffice. Typing, or any form of mechanical reproduction is acceptable, if it is clearly legible. *All* manuscripts submitted to the editor will be re-typed and identified only by a code number. This will insure an objective and impartial evaluation by the Academy's Research and Publications Committee. The editor will not reveal the identity of the writer to any person without the author's express consent.

Suggestions, criticisms, or comments on matters relating to the Journal will at all times find a welcome reception.

THE EDITORS

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CHARLES LASELLE JAMISON

Founder, The Academy of Management

Charles Laselle Jamison

The initiative and foresight which have characterized the activities of Professor Charles Laselle Jamison are perhaps best typified by his service to the Academy of Management. In 1936 he saw that management was becoming a major field of teaching and that this development would be furthered by an organization of teachers of management. On the evening of December 28, 1936, in conjunction with Professor William N. Mitchell, of the University of Chicago, he invited a number of teachers of management to attend a dinner at the University of Chicago's Quadrangle Club for the purpose of discussing the formation of an organization of educators to advance the philosophy of management. Ten professors attended this initial meeting, which evinced sufficient interest to encourage an attempt to hold an all-day conference the following year during the Christmas holidays of 1937.

Professor C. Canby Balderston, of the Wharton School, University of Pennsylvania, offered facilities of the Lenape Club in Philadelphia. Success of this 1937 conference led to a second meeting on December 30, 1938, at the University of Michigan, where twenty-one men attended an all-day round table discussion of management topics. In 1939 Professor Jamison sent invitations for a third meeting, which was again at Philadelphia's Lenape Club. The same informal procedure was followed in 1940. This time a conference was held at Northwestern University in Chicago. Growing interest in the annual conferences encouraged the structuring of a more formal organization: A constitution was drawn up by Professor Ralph C. Davis, the name "Academy of Management" was adopted, officers were elected, and the Academy was formally launched at New York University on December 30, 1941. But just three weeks earlier the Pearl Harbor attack had put the United States into World War II, and the newly born Academy remained comatose, not to be revived until the fall of 1947.

An incident which illustrates the degree of interest and effort that Professor Jamison put forth in founding the Academy of Management was recently related by Professor Ralph C. Davis:

> In 1936 or 1937 I was enjoying a quiet vacation at the home of my parents in Mohawk Valley. One day I received a long-distance telephone call. Charlie Jamison was on the other end of the wire. Mrs. Jamison and he were on their way through the Adirondacks for some vacation destination. Charlie wanted to know if I would drive up to Blue Lake to talk over the embryo Academy of Management with him. I told him that I would and I did. Charlie interrupted his trip and added at least a day's time in transit to do some missionary work in arousing and maintaining interest in the foundation of the Academy. We all agree, of course, that he has earned the title, "Father of the Academy of Management."

Professor Charles Laselle Jamison, presently professor emeritus of business policy at the University of Michigan, was born in Rochester, Pennsylvania on February 17, 1885. His youthful ambition was to be a banker and, at the age of eighteen, he took a job as a clerk in the Union National Bank in Pittsburgh. After several years he became dissatisfied with the limited opportunities and the relatively slow progress and decided to embark upon an education in Commerce, entering the University of Wisconsin in 1909. Upon his graduation in 1913, through acquaintanceships formed at the Union National Bank, he was offered a job as assistant treasurer of A. M. Byers Company, Pittsburgh. Within the short space of three years he was made Secretary and Treasurer and worked in that capacity with this Company until 1921. From 1918-19 he served in the United States Army as a Captain in the Quartermaster Corps, being assigned to the Director of Finance.

The desire to teach business management rather than practice it became so great that in 1921 he accepted a one-year lectureship at the University of Minnesota. From Minnesota he went to the University of Wisconsin, where he received his M.A. degree in 1924, pursuing this work some eleven years after having completed his undergraduate degree. While at Wisconsin he was promoted rapidly, holding the ranks of assistant professor, associate professor, and professor of business administration between 1922 and 1929. His Ph.D. degree was received from the University of Chicago in 1930, when he was forty-five years of age.

Professor Jamison joined the faculty of the University of Michigan in 1929 as professor of business policy. He held this position until his retirement in 1955. He is presently professor emeritus of business policy at the University of Michigan.

His writings reflect his earlier interest in finance and banking and his later interest in business policy. Among his more significant contributions in the textbook field are *Finance,* published in 1927 by Ronald Press and *Business Policy,* published in 1953 by Prentice-Hall.

Professor Jamison has taken an active interest in a variety of professional societies, groups, and fraternities. Among these are the American Economic Association, the Society for the Advancement of Management, the American Association of University Professors (he was a member of the National Council from 1941-1944), Beta Gamma Sigma, Phi Beta Kappa, and Alpha Kappa Psi. He is a Fellow of the Academy of Management and has served from the beginning of the organization as Chairman of the Fellows group.

Since his retirement in 1955 Professor Jamison has traveled extensively and has maintained his keen interest in research and teaching. In 1956 he taught one semester in the Internal Revenue Advanced Training Center at the University of Michigan and in 1960 he was visiting professor at the University of Minnesota for the spring term. He has worked on a variety of research assignments for Brookings Institution, the Ford Foundation, the University of Michigan, and other organizations. He is presently designing a new course in economics under the sponsorship of the Charles Stewart Mott Foundation. Although still located at the University of Michigan, Professor Jamison holds a temporary appointment as research professor of the Detroit Institute of Technology and is closely associated with the University of Chicago on some of his research projects. One current research interest relates to his growing concern in regard to the erosion of management authority in industry.

Charlie Jamison has former students and friends on almost every campus of the country. His students remember him as a dynamic and stimulating teacher. His associates have long been impressed with his searching and imaginative scholarship. All of his acquaintances remember Charlie Jamison the administrator, the scholar, the teacher, the organizer as "an enormously friendly and affable person."

To say that the Academy of Management is deeply indebted to Dr. Jamison for his vision and unselfish service is a serious understatement. It is indeed a signal privilege and a great pleasure to honor Charles Laselle Jamison through the humble pages of our Academy's *Journal.*

PRESTON P. LEBRETON

University of Washington

Opportunities Ahead for The Academy of Management

JOSEPH W. TOWLE*
Washington University

The First Annual Conference of the Western Chapter of the Academy of Management marks an important epoch in the history of this society, which first convened in 1936. From its beginning the members of the Academy preciously guarded their rights to meet together as teachers and theorists in the field of management and administration. Efforts were successful in limiting the memberships of businessmen in the Academy to those who could contribute to intellectual and scholarly discussions on management subjects. Because of these restrictions, our Academy has retained its character as the society for professional teachers in the general management field.

This conference can be credited with at least three notable accomplishments. First, in the tradition of the Academy, you have provided a forum for the presentation and the analysis of current topics of major concern to teachers of business administration. Second, this meeting provides the opportunity for the completion of plans to organize the Western Chapter of the Academy of Management. And third, the actions of participants at this conference constitute an invitation—and an example—for Academy members and management professors in other parts of the country to meet together, to confer, and to develop similar regional organizations. With these accomplishments your Chapter is supporting the Academy in the achievement of its most important objective, " . . . to foster the search for truth and the general advancement of learning through free discussion and research in the field of management." [1]

Today, in the midst of our changing American scene, the professor of business administration has finally been recognized on the college campus. His once precarious position among teachers and scholars now appears to be assured. No greater citation of the accomplishments and the values of the business schools can be found than is evidenced by the publication of the Ford and Carnegie Foundations' reports. Even the criticisms in these reports attest to the importance of the collegiate schools of business.

Because some of these criticisms reflect upon many well-informed and highly progressive professors, they represent, in part, an injustice. But let us accept the

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* Professor Towle is President of the Academy of Management. His picture is shown as an insert on page 205. This article is adapted from an address delivered before the First Annual Conference of the Western Chapter of the Academy of Management, Ambassador Hotel, Los Angeles, California on May 21, 1960.

[1] From the Constitution of the Academy of Management.

challenge. Our task is here: to prepare future administrators of business enterprises for the ever-changing problems which they will face, and to help all managers cope with the dynamics of their current and potential assignments. Through the teaching of university students and through management consulting and research, business school professors have the opportunity to take the lead in the development and improvement of management. We are in a position to create innovation and change in business rather than " . . . to keep informed of new developments. . . . " [2]

THE CHALLENGE THAT MANAGEMENT IS A PROFESSION

There are many differing opinions concerning the status of managment as an art, a science, or a profession. Evidence has been presented that it is all three. It should be noted, however, that teachers of business administration are members of what is loosely known as the teaching profession. The learned professions are still considered to be theology, law, and medicine, but other vocations, such as teaching, are referred to as professions also.

Through the activities of associations and societies, some business executives attempt to establish their business occupations as professions. Among these are groups of personnel directors, industrial engineers, purchasing agents, accountants, controllers, and office managers. Because of the nature of their activities and partly due to the establishment of standards for certification, the public accountants have made real progress in having their vocation recognized as a profession. But, how can general management be given professional status?

It is suggested here that we in the Academy of Management, and others affiliated with collegiate schools of business, now specifically recognize the master of business administration degree as one of the prerequisites for entry into the profession of management. This is not to say that an individual could not become a professional manager without an M.B.A. It is merely to say that the completion of a graduate program of study in business administration in an accredited university meets the minimum requirement of the profession for formal training and study in the field. Obviously, other degrees or experience or the completion of management development programs could raise the professional status of a manager, but the M.B.A. degree can and should be recognized as a basic stage of management specialization and accomplishment.

At the annual meeting of the Academy of Management in December, 1956, Professor Harold Koontz presented a paper entitled, "A Preliminary Statement of Principles of Planning and Control." In this paper Professor Koontz states:

> In the field of management, then, what is needed is groupings of interrelated principles—theory, if you will—dealing with the various aspects of the manager's job. Some of the principles which comprise a theory of management can be readily recognized from the observation of management experience, others may be offered as hypotheses subject to verification, and still others will be discovered and codified as the analysis of the management process continues.[3]

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[3] Gordon, Robert A. and Howell, James E., *Higher Education for Business*, Columbia University Press, New York City, 1959, p. 436.

At this stage in our development of these principles of management, we are still asking ourselves, "Are these principles truths—or dogma—or philosophy?"

The general manager of a business enterprise is besieged with differing theories and techniques for the solution of his problems. He is told that his profits can be increased by employing organization specialists, human relations experts, operations researchers, motion and time study men, wage incentive engineers, cost accountants, industrial psychologists and sociologists, and a host of others. The manager's first great decision is to select a suitable technique or method for improving his decision making. Naturally, he is amazed when he finds a management consultant who is able to offer all of these specialties in one neat package. After brushing aside the charlatans and the pseudo-scientists, the bewildered general manager still has difficulty in selecting and using scientific management counsel intelligently and wisely.

But our ability to develop a body of knowledge which might be known as the principles of management or the philosophy of management—thereby assisting managers of business enterprises and at the same time promoting management as a profession—depends upon many things. One important need is the reconciliation and the integration of the various current approaches to management, namely, the functional approach, the problem-solving approach, and the analytical or so-called "management-sciences" approach. We must progress beyond the position taken by some business school professors, who, using the case study method exclusively, refuse to admit that there are principles which can be taught. Likewise, the strong proponents of the lecture method of teaching who believe firmly in specific principles of management and who make little use of case studies might well investigate the advantages of involving students in case analyses and problem solving techniques. And all professors of management must determine the proper relationship between the traditional concepts of the management function and the new techniques of the management sciences, such as operations research, linear programming, waiting line theory, behavioral science theory, and others. The need is great for teachers of management to understand and to integrate into their own courses the findings and the accomplishments of the social scientists and of all those who use the analytical approach to problems. We must determine the manner and the extent to which quantitative analyses and mathematical solutions to problems will eliminate, supplement, or complicate the traditional functions of planning, organizing, and controlling work activities. In other words, what changes in our older concepts of management are and will be required as a result of the advent of the "management sciences"?

THE ESTABLISHMENT OF ETHICAL STANDARDS

Before leaving the subject of a management profession, some reference should be made to the need for the establishment of ethical standards. Certainly the standards of businessmen have been raised since the days of the so-called "robber barons,"

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[8] Koontz, Harold, "A Preliminary Statement of Principles of Planning and Control," *Proceedings of the Annual Meeting*, The Academy of Management, August, 1957, p. 35.

but the days of "disc jockey payola" and "high cost law enforcement" suggest that further progress is needed. New social situations create business management problems and the need for decisions which have never been faced before. As management strives to become a profession, a more logical and a more consistent basis must be found for the determination of moral and ethical standards of behavior. Although progress has been made along these lines in the past, it will be the responsibility of educators in the field of business administration to pass along our highest concepts of morals and ethics to each succeeding generation of managers. Dr. Robert E. Wilson, of the Standard Oil Company of Indiana, has given us some reasons for comparatively high standards in the behavior of businessmen. Among others, his reasons include the following.

> Business can be carried on far more effectively and promptly when honorable men are dealing with one another. Life is too short to maintain an adequate guard against a person whose integrity is doubtful, so one simply avoids dealing with him. If a business is to grow and prosper it must be firmly rooted in fair dealing.
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> * * * * *
>
> Most men attain the leadership of our large corporations today by a long process of step-by-step promotion in competition with others. As Dr. Copeland of Harvard says in his recent book, "Because of this continual sifting process, it is rare that a man attains a high executive position in a well-established company who does not measure up to a high standard of conduct." Such men would be foolish if they did not regard their honor as of far more importance than any dishonorable profit.
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> * * * * *
>
> But the story of the reasons for the high standards of business ethics in America would be lamentably incomplete if tribute were not paid to the two greatest factors in the whole moral climate of America—namely, the influence, throughout our history, of our churches and our colleges. They are the institutions which have fed the fires of idealism in a material world and have guided and educated the consciences of all of us.[4]

In the future we can expect increasing numbers of administrators to look to our collegiate schools of business for leadership in the establishment and the elevation of moral standards in business.

OUR CHALLENGE AS EDUCATORS

As professors of management in universities and colleges, the greatest opportunities for Academy members lie in the field of education. Our first responsibilities are to our graduate and undergraduate students, the young men and women who plan for careers in business and select business administration as their collegiate course of study. The challenge ahead is to improve the standards of our academic work. Fortunately, we have the Ford and Carnegie Foundation Reports to assist us in reappraising our performance and in indicating those activities which need our attention. Although these reports are overly critical in some conclusions, I quote

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[4] Wilson, Robert E., "Ethics and Principles in Modern Business," an address before the Congress of American Industry, New York, N. Y., December 5, 1951.

two additional statements from the Ford Foundation Report, "Higher Education for Business":

> We still know too little about the kinds of qualities that make for success in business and other administrative careers, and in what ways formal education can most effectively contribute to the development of managerial competence.
>
> ... Research in the business schools needs to become more analytical, to develop a more solid theoretical underpinning, and to utilize a more sophisticated methodology.[5]

These suggestions stress the need for closer study of business leadership and for more basic research—research in management and research in the teaching of management. We do some research in these areas, but for most college professors there is the dangerous temptation to assume too many responsibilities. Teaching, research, consulting, and writing opportunities are always available. But none of us is able to perform all of these activities simultaneously. The quality of our work frequently suffers because we attempt to carry too many projects. Possibly more realistic planning and organizing of personal activities by business school professors could result in greater research efforts and improved teaching.

A second opportunity in the field of business education is the important role which the business school professor now plays in advanced management training and executive development programs. In recent years business executives have been convinced that their education is a continuing process. The opportunity is present for the schools of business administration to assume the leadership of these programs of adult education.

Another challenge facing both managers and teachers of management has been described by Professor Peter Drucker, of New York University, as the future problem of "managing the educated." Drucker points out that our labor force is becoming better educated and that it will eventually consist primarily of high school graduates. Fortunately, the number of unskilled jobs in industry has remained almost constant, while the numbers of semi-skilled, skilled, and technical jobs have increased rapidly. Positions for managers and for technical and professional workers are growing at the rate of 10% per year, which is three times faster than our growth in population.[6] In the future, management will be challenged to cope with problems of supervising large numbers of educated, well-informed, and specialized workers. Routine and menial tasks may be performed by people who have spent twelve or more years in classrooms learning how to think. Many will have difficulty in finding adequate job opportunities. Better educated and well-informed workers may rebel against hasty or ill-advised decisions. They may expect and demand more intelligent leadership. Our current research findings in group dynamics, industrial organization, sociology, and patterns of leadership have arrived none too soon to prepare us for these problems.

In our considerations of management, management education, and our positions as educators, we have paid tribute to the comments and criticisms of the economists

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[5] Gordon, Robert A. and Howell, James E., *Higher Education for Business*, Columbia University Press, New York City, 1959, pp. 425, 436, and 439.

[6] See Drucker, Peter F., "Managing the Educated," *Management's Mission in a New Society* (Dan H. Fenn Jr., editor), McGraw-Hill Book Company, New York, 1959, pp. 163-178.

Gordon, Howell, and Pierson. What are we doing about the criticisms of others in the liberal arts colleges? Not long ago the president of a small liberal arts college asked a group of business school professors what exposure the business school student has to literature, music, art, philosophy, and the like. He specifically asked, "Do you consider that the business school graduate is an educated man?" This query rests uncomfortably on the minds of many managers and teachers of management and prompts us to consider the need for educating the "whole man." Can we provide our students with the opportunity and the time to learn more about the world around us and to inquire into the non-management arts and sciences?

THE CHALLENGE OF SCIENCE AND TECHNOLOGY

Many questions which managers must resolve now and in the future result from the great impact of science and technology upon our society. Scientific research today foretells management problems of the future, and one of the greatest changes in business leadership is expected to result from what might be called "the erosion of management authority." Bertrand Russell, the great English philosopher, described this trend by saying, "The triumphs of science are due to the substitution of observation and inference for authority."[7]

The scientific approach, Russell's "observation and inference," is improving management decisions by providing more and better information, leaving less and less to chance, and narrowing the manager's area for judgment and conclusions. With the scientific or refined treatment of factual data for problem-solving, the area of responsibility which can be controlled by any one individual is being greatly reduced and limited. It may be harsh to describe this trend as an "erosion of authority." It might be better to think of it as a continuation of the division of labor which has been evidenced for many years by the establishment of specialized staff departments in industry and as a concomitant of the encroachment upon management authority by labor unions and other groups. Applications of the new management sciences will continue to reduce the number of instances where managers can make personal decisions, but great skill will be required in the co-ordination of the efforts of the specialists who use the new tools of scientific management. With these changes in the management of business operations, new solutions to old problems will be necessary and management procedures of the past may be inadequate in the future.

The great challenge of science to professors of business administration now appears to be threefold: (1) to be acquainted with and to understand the engineering and technological changes taking place in industry, (2) to develop and to teach the most scientific approaches to business management problems and thereby to incorporate the management sciences into the programs for business education, and (3) to teach managers and future managers how to understand and how to handle the human and organizational problems which accompany technical innovation and change. This third responsibility may be a matter of helping the students to develop

[7] Russell, Bertrand, *The Impact of Science on Society*, Simon and Schuster, New York, 1953, p. 89.

an attitude which permits acceptance of change. In the matter of managing technological change, attitudes may be more important than technical skills.

In our study of the new management sciences we need not question the values of what was formerly known as "scientific management." Business managers have always attempted to make analyses from quantitative data. Decisions based on calculations of facts and figures are common procedures in business, and the quantification of data has long been a function of the accountant, the statistician, the finance man, and the industrial engineer. The new management sciences promise to go beyond the older analytical methods in the solution of our new complex problems. This should be viewed as progress in scientific management based on the strong foundation established by Frederick W. Taylor, Frank Gilbreth, and other pioneers in the field.

CONCLUSION

In conclusion I would like to point out that our Academy of Management consists of a small, exclusive group—353 professors from 123 universities and colleges in the United States and 3 universities in foreign countries. A few distinguished businessmen are members of the Academy. Our membership includes most of the authors of the textbooks on general management and production and personnel management now used in our colleges and universities. Through these writings and through our teaching and research, literally thousands of students each year are encouraged and guided toward positions of responsibility in business. Many of these students develop administrative skills and a zest for business under our direction. This is the great challenge and the greatest opportunity given to us as professors of management.

Since the members of the Academy are more interested in the theory of over-all business policy, organization, and general management than any other group or association membership, we have a special and unique opportunity. Research workers and leaders in the various fields of science and the academic disciplines are becoming so highly specialized that communication and interdisciplinary problems arise. Even in our own schools barriers have been erected among the various functional fields of business, and specialists in marketing, finance, production, accounting, and personnel specialists have difficulty in communicating freely with one another. The over-all administrative viewpoint draws upon all of the physical and social sciences and within our Academy we have the forum for discussions and exchanges of ideas. This gives us the opportunity and the challenge to co-ordinate and integrate the knowledge and the wisdom coming from all scholarly sources. These are opportunities to "synthesize" and to "generalize" the kinds of materials which will improve our effectiveness as teachers of management.

Our conclusions imply that professors of management play many roles. We must try to be educators in the highest sense; we should be professional men—teachers as well as business men; we must strive to be scientists—doing research to improve our teaching and to improve business and management operations; and, finally, we must try to be authors. To do all of these things—to play all of these roles well—appears to be impossible. But we do have the opportunities, and through our activities we

can establish ourselves as leaders in the field of business administration—leaders to whom businessmen come for guidance and counsel, and leaders whose examples students will be proud to emulate.

It is truly gratifying to see that the first annual meeting of the Western Chapter of the Academy of Management has moved in the direction of a stronger and a more influential Academy and that it has promoted improved programs in schools of business administration. May this meeting be the first in a long series of regional or chapter conferences and may they all contribute significantly to the achievement of our Academy objectives!

An Approach to Quantitative Analysis for Organization

HERBERT G. HICKS
Lousiana State University

INTRODUCTION

Physical space is one of the most important dimensions of organization or departmentation. As Anderson and Schwenning say, ". . . the oldest and most common basis for the grouping of workers . . . is that of space, location, or geography."[1] While the effect of space on organization has been recognized for years, few efforts have been made to quantitatively analyze this relationship. The central purpose of this article is to demonstrate how mathematical analysis can be helpful in solving the problems of organization in which space is a significant factor. These include, among others, multi-plant planning, factory layout problems, and optimum office-layout arrangements. The possibility of adapting the same type of mathematical analysis to non-space areas of organizational analysis is also briefly considered. The analysis tends to strengthen and augment the theory of organization through the introduction of quantitative techniques to problem areas which until now have enjoyed few applications of the quantitative approach. The author hopes at a later date to be able to report on the results of applications of these concepts to specific organizational problems.

SPACE AS A VARIABLE OF ORGANIZATION

To say that space is a dimension of organization is tantamount to saying that space is a *variable* of organization. Then, if space as a variable is expressed in mathematical form, quantitative analysis will be of considerable value in analyzing and contributing to the solution of particular problems of organization.

In considering the problems of organization the manager is guided by the same basic criteria which control his decisions in the other functional areas of management. As economists tell us, he should maximize certain quantities, such as revenue, and he should at the same time minimize other quantities, such as cost. These two criteria are, of course, complementary: profit is greatest only when the interacting influences of revenue and costs are simultaneously considered.

Because physical space is expensive, cost can be lowest only with the best possible physical layout of the production factors. The usefulness of mathematical analysis in determining this optimum layout will be shown by the following analysis.

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[1] E. H. Anderson and G. T. Schwenning, *The Science of Production Organization* (New York, John Wiley and Sons, Inc., 1938), p. 109.

DEVELOPMENT OF THE THEORY

Assume that a firm is going to hire ten workers to work at ten desks in one large room. Assume further that physical conditions require that the desks be arranged in a rectangular pattern similar to the arrangements of dots on the grid of the x-y co-ordinate system shown in Figure 1. The arrangement of the desks need not necessarily be exactly the same as that of the dots in Figure 1. However, for simplicity of analysis, it is required that their final arrangement be such that dots representing this arrangement would fall only upon points of intersection of lines representing whole numbers on the co-ordinate system. In other words, the final layout must be such that the arrangement of the desks (and workers) and the co-ordinates of any desk can be expressed in whole numbers on a rectangular co-ordinate system.[2]

The layout is evaluated in terms of relationship and relationship distances. As a drastically simplified example, relationship may be taken to mean that the nature of the work is such that the two workers concerned are forced to rely upon physical personal contacts with each other in order to perform their work efficiently.[3] Accordingly, it is desirable to so arrange the work (in this case, the desks) that workers will be physically close to the other workers with whom they have contacts. Assume that the relationships of the workers involved are as shown in Table 1.

TABLE 1

THE WORKING RELATIONSHIPS OF TEN WORKERS

Worker	Has relationships with workers
A	C, D
B	F, G
C	E
D	E, A
E	D, B, C
F	J (negative relationship)
G	J, I
H	A, G
I	B, C, D, F
J	B, E

In order to keep the analysis as simple as possible, it is assumed that all contacts are of equal importance.[4] Moreover, it is also likely that some of the relation-

[3] This assumption permits a relatively simple analytical solution without being unduly restrictive.

[3] Complications, such as the desirability of using telephone communication for some of the workers, would, of course, be given consideration in an actual model.

[4] This, of course, will probably not be the case in an actual situation. However, such variables may easily be introduced into the analysis through the use of weighting factors to make the model more nearly fit the situation. For example, if a certain relationship is one-half as important as the standard, then the weighting factor of 0.5 would be multiplied by the appropriate term in equation (2).

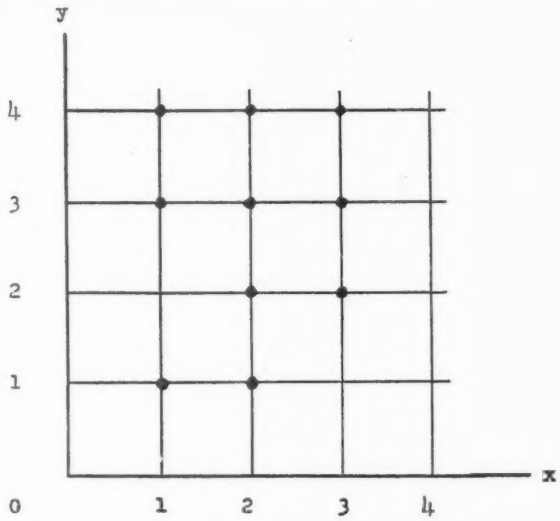

Figure 1. Co-ordinate System Showing a Possible Arrangement of Desks and Workers

ships will be negative. For example, two workers may have personality conflicts and would work better when physically separated from each other. In such an event, the relationship may be introduced as a negative factor in the solution. The analysis would then consider the fact of desirable physical separations of workers along with desirable close contacts in determining the optimum solution.[8]

Some of the relationships are unilateral (for example, worker A with worker C); some are bilateral (for example, A with D, and D with A). These factors are introduced into the analytical solution by doubling the importance of the relationship.

If all relationships are plus values, the optimum theoretical layout is the one where all workers work at the same point in space. Since such a suggestion is obviously ridiculous, the requirement has been included that all of the desks be located at intersection points on the grid, and this, in turn, requires that no two desks can be located less than one unit of distance from another. There is no restriction in practice on how small this unit of distance may be except, of course, it must be large enough to provide the necessary physical separation of the desks. Moreover, there is a practical limitation on how large it may be because too much space is excessively costly. Too much space also results in a diminution of the favorable results that were assumed to be realizable by putting the workers in close physical contact with each other—except in the case of those with negative relationships. However, the most important consideration in this problem is the *structure*, or *arrangement*, of the units, not their spacing.

[8] The relationship of F to J in Table 1 is assumed to be negative.

SOLUTION TO PROBLEM

It is desired to find what arrangement will minimize the total *"relationship distance"* among all workers. Since costs are assumed to vary proportionally with distance, costs are minimized only when the desks-with-workers are so arranged that the total of all relationship distances among them is a minimum.

Let the co-ordinates of the nth workers be x_n and y_n. Then the co-ordinates of worker A are x_A, y_A, and the co-ordinates of worker C are x_C, y_C. The distance from worker A to worker C may be found with the aid of the co-ordinate system. See Figure 2.

The y distance between workers A and C is $(y_A - y_C)$. The x distance is $(x_C - x_A]$. The sign (plus or minus) of the x and y distances is immaterial because when the quantities are squared, the resulting square is a plus value in any event. The diagram describes a right triangle. Since the hypotenuse of a right triangle equals the square root of the sum of the squares of the sides, the total distance from worker A to worker C is,

$$\sqrt{(x_C - x_A)^2 + (y_A - y_C)^2} \qquad (1)$$

Let this quantity be represented by the symbol d(A to C). The total relationship distance is the sum of the individual distances. Each individual distance may be derived as above. If the total distance equals TD, then,

$$\begin{aligned} TD = {} & d(A \text{ to } C) + 2d(A \text{ to } D) + d(B \text{ to } F) \\ & + d(B \text{ to } G) + 2d(C \text{ to } E) + 2d(D \text{ to } E) \\ & + d(B \text{ to } E) - d(F \text{ to } J) + d(G \text{ to } J) \\ & + d(G \text{ to } I) + d(A \text{ to } H) + d(G \text{ to } H) \\ & + d(B \text{ to } I) + d(C \text{ to } I) + d(D \text{ to } I) \\ & + d(F \text{ to } I) + d(B \text{ to } J) + d(E \text{ to } J). \end{aligned} \qquad (2)$$

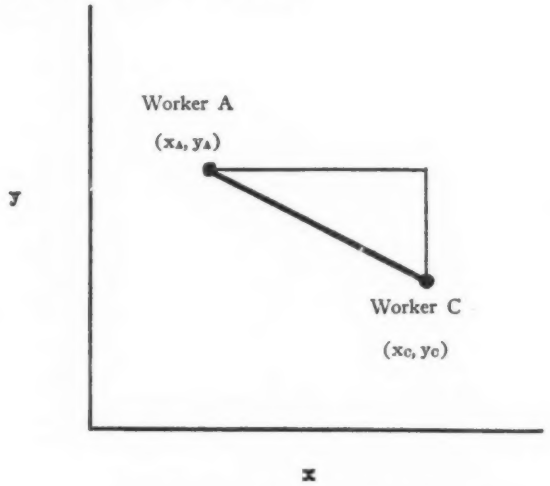

Figure 2. Diagram of the Distance between Workers A and C.

Note that the weighting factor of two is employed in the case of bilateral relationships. Note also that the negative relationship (F with J) is properly expressed as a negative distance. When the function TD is minimized, within the boundary conditions that the practical problem of available space would impose, the distance from F to J [d(F to J)] will tend to be maximized. Workers F and J will thereby be located as far apart as possible within the actual floor space that is available.

The optimum arrangement is the one where the total of the relationship distances is minimum. This will be the arrangement that minimizes TD within the framework of the appropriate constraints.† A trial and error procedure yields the desired answer by trying all possible arrangements and substituting in the above equation to find what arrangement gives the smallest TD. However, such a solution, while possible, requires a prohibitive amount of computation—if the computation is done by hand—because of the vast number of possible arrangements. A numerical solution does exist, however, and it can easily be found with the aid of an electronic computer. The method of analysis, however, is considered more valuable than the numerical solution, because the method may be adapted to a large variety of organization problems. The procedure is simply one of maximization and/or minimization.

This example is concerned with the solution of a problem of organization considering only one physical level of the organizational structure. A co-ordinate system of two dimensions is adequate to express the problem in quantitative terms.

APPLICATIONS TO OTHER PROBLEMS

To adapt the analysis to other problems of organization is—at least conceptually—a simple matter. It is necessary only (1) to select a function to be maximized or minimized,[6] (2) to find a means of measuring this objective function—in this case, a co-ordinate system, and (3) to maximize or minimize the function, as the case may be. This is equivalent to finding the solution that will maximize profits and/or minimize costs.

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†Editor's note: In the present problem the following constraints would seem to be appropriate: (1) that the co-ordinates be integer-valued (Professor Hicks has already specifically mentioned this restriction); (2) that $x_A = y_A = 0$, (This is another way of saying that worker A has been arbitrarily placed at the origin of the x-y co-ordinate system, thus providing a point of reference for appropriately spotting all other desks in such a way as to minimize TD. It is, of course, a matter of indifference whether worker A or one of the other workers is placed at the origin, because, in the optimum solution, an identical configuration of workers will result even though their x and y values would be different depending upon the point of reference that had been selected); (3) that the *absolute* distance in a y direction between any two desks, say, B and C, is less than or equal to the length of the available space measured in a y direction—or, stating the same thing mathematically: that $| y_B - y_C | \leqslant$ the available space in a y direction; and (4) that $| x_B - x_C | \leqslant$ the available space in an x direction.

[6] This "objective function" should either be something that varies directly with short- and long-term cost or profit—in this case, relationship distance—or something that is at least indirectly related to cost or profit and can to some extent be evaluated in cost and profit terms, as, for example, time, the degree of difficulty, or the morale consequences of particular arrangements. The analyst should, of course, use whatever objective functions are most meaningful and most convenient.

Finding a means of measuring the objective function is not always easy, but an attempt to quantify qualitative variables must constantly engage the attention of the organization analyst.

This method of approach appears to be equally valuable in the analysis of organizational problems involving more than one level of the organization. In such a case, the different levels can be viewed as layers stacked on top of each other, with the lowest level of the organization on the bottom, the highest level on top, and the intermediate levels in proper sequence in between. Three-dimensional analysis, including an x, y, and z co-ordinate system (z representing the vertical parameter) could then be employed, and a solution for a problem involving more than one level of organization could be obtained with the aid of a computer.

Through such procedures, the many helpful quantitative techniques which have been developed in mathematics and other fields can be applied to the solution of problems of organization. Although the approach suggested in this article is non-linear (since the exponents appearing in the expressions are other than 1), it is possible to formulate this general class of problems in terms of linear and other types of programming models.

It is hoped that the general approach suggested herein will stimulate interest and thought in adapting quantitative tools to a wider range of organizational problems.

Integrating the Behavioral Sciences and Management

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INTRODUCTION

In this, the Gordon and Pierson age of business schools, it would hardly appear proper, or even safe, to condemn or minimize the importance of the behavioral sciences to the teaching and the practice of management. It might be easier to disparage motherhood or the flag than to approach business administration from a purely "economic man" point of view. The question is no longer "whether" but rather "how" and "how soon" can the behavioral sciences be effectively integrated into management education. I suspect before long it will be "how much?".

Integrating behavioral science into management and management education involves the two mainstreams of all education: (1) the advancement of the particular discipline itself—in this case the theory of organization and organizational behavior, and (2) the effective transmission of this discipline through the educational process.

The advancement of our knowledge is progressing at an increasing rate, as is reflected in the research programs underway and the growing body of literature on the subject of organization theory and organizational behavior. In this paper I would like to direct my discussion to the problems posed for schools of business in translating the research findings of this developing field of behavioral science into the subject matter and teaching patterns of schools of business and, particularly, their management divisions. I do not propose to deal with problems of curriculum building or specific course content, but rather will assume that the mechanical aspects of developing courses will follow naturally from the reorientation of goals and the development of qualified faculty in the areas of behavioral science and management. And I suggest that we content ourselves at this stage with raising and clarifying issues rather than with posing premature solutions.

THE THREE PROBLEM AREAS

The case for prompt and vigorous action in integrating the behavioral sciences with management education and practice is stated quite concisely by Douglas McGregor in his recent book, *The Human Side of Enterprise*, in the following words:

> I share with some of my colleagues the conviction that the social sciences could contribute more effectively than they have to managerial progress with respect to the human side of enterprise. There are, of course, many reasons why improvement has been slow. Some have to do with the social sciences themselves: they are still in

> their adolescence in comparison with the physical sciences; their findings are piecemeal and scattered; they lack precision; many critical issues are still in controversy. These are relative matters, however. One need only contrast the situation today with that thirty years ago to recognize that much has been accomplished. The social sciences are a rich resource today for management even though they have not reached full maturity.[1]

The problem areas in transmitting the findings of behavioral science through the management divisions of our colleges and universities include at least the following:

1. The problem of interpreting behavioral science research findings for what still is essentially a non-scientific audience.

2. The problem of identifying the core of behavioral science knowledge and its limitations and collecting this into more than fragmentary compendia.

3. The problem of finding or developing the quality of faculty that can ably judge and interpret the meaning and relevance of research and that can instill the business administration student and the business administrator with the romance and excitement of it.

In exploring approaches to coping with each of these problem areas, we are tempted to have a fling with the dramatic solution—that of completely reorganizing business schools. Although this will certainly attract public attention, it might rapidly run its course, perhaps as a fad. I suspect the long-run approach will still be one of gradual but fundamental progress toward achieving all three of these goals. And, I think, this progress must go on concurrently in all problem areas: one cannot deal effectively with one of these in isolation, although programs in any one will be a stimulant also for progress in the others.

THE PROBLEM OF LANGUAGE

The first set of problems is that of making the findings of behavioral sciences intelligible to the business administration student and to the business administrator himself and relevant to the problems that these men face. Professor McNaughton of the University of California at Los Angeles alluded to this problem at the Academy of Management meeting in Washington, D. C. last December. He stated,

> [One] reason businessmen do not apply the scientific approach to the management of people more than they do can be attributed to their inability to understand the scientific jargon. To the businessman, the researcher speaks an alien tongue. So, even if a manager were sympahtetic with the work being done by social scientists and succeeded in finding the reports of their investigations, he probably would quickly become disillusioned. This is true because of the passion of scientists to impress their colleagues, and their indifference with respect to the use made of their research. This criticism is chiefly leveled at the "pure" scientists although the "applied" scientists are far from being blameless.[2]

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[1] McGregor, Douglas, *The Human Side of Enterprise*, New York, McGraw-Hill Book Company, Inc., 1960, pp. 4-5.

[2] McNaughton, Wayne L., "Application of the Scientific Approach in the Management of People," *The Academy of Management Proceedings of the Annual Meeting*, Washington, D. C., December 29, 1959, p. 89.

Douglas McGregor, of the Massachusetts Institute of Technology, one of these "applied scientists" whom Professor McNaughton might consider an exception to his statement, takes a firm stand in defense of the scientist and his jargon. He has written,

> I am not particularly impressed with arguments that social scientists do not publish their findings in language intelligible to the layman. Neither do physicists! Also, while it is lamentable that some social scientists jump incautiously from relatively precarious theory to practical applications, and others refuse to concern themselves at all with applications, there is nothing unique about social science in these respects. Today most managers are forced to rely on "middlemen" in the form of social scientist consultants or staff, or on literature intermediate between scientific journals and the Sunday supplements to interpret theory and research or to help them judge the scientific adequacy of claims or proposals. The time is not far off when the competent manager—like any other professional practitioner—will find it a necessity to be well enough versed in the scientific disciplines relevant to this work to be able to read the literature and judge the adequacy of scientific finds and claims.[8]

But until the date of enlightenment when the competent manager will read and interpret the scientific literature for himself, there must perhaps arise a new profession of "science interpretation" to provide the missing link between research and practice. This, for some years to come, will likely be a major role of the professor of management in our schools of business. But he will not be without considerable help from various sources.

Professor McNaughton suggests we need an elite group of science interpreters who need to be both competent scientists and skillful writers. He mentions Paul DeKruif and Stuart Chase as examples. I believe we already see a group of applied scientists emerging who can speak quite directly to the business professor, the student, and the administrator. Included in a list of such science interpreters are Mason Haire, Douglas McGregor, Chris Argyris, William F. Whyte, Alex Bavelas, Melville Dalton, and many others. Their media for expression and interpretation are not likely to be only the scientific journals but also the journals of business, such as the *Harvard Business Review, Fortune,* the *Journal of Business,* the *California Management Review, Business Horizons,* the *Journal of the Academy of Management,* and similar literature which reaches both the business administrator and the business student directly and regularly. These journals, together with the publications of various industrial relations centers and collections of articles in "readings" books can form an effective bridge between the behavioral sciences and business. It can also provide a useful link for any professor of management who is concerned with relating behavioral science to management even though he himself is not the pure behavioral scientist.

It seems likely that the problem of finding a common language will be resolved by a gradual movement of both parties from opposite poles toward a middle ground. The management professor can be highly influential in helping the future professional manager develop a concern for, an interest in, and a capacity for interpreting the scientific literature in behavioral science as it applies to business. But in the mean-

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[8] McGregor, *op. cit.,* p. 5.

time, for existing members of management and for many potential managers not possessing the advantage of such broad orientation, the initiative for interpretation must remain largely in the hands of the applied scientists themselves, with a considerable boost from the professors of business administration who can reasonably communicate both in the language of business and in the language of behavioral science.

AN EVOLVING DISCIPLINE

The second problem is one of developing a systematic body of behavioral science knowledge as it applies to management. Considerable progress is already evident in this area. It was only a few years ago that the first attempts were made to organize into a conceptual framework the fragmentary knowledge and ideas concerning human relaitons in business. Keith Davis was one of the pioneers in this movement.[4] Chris Argyris is another.[5] This movement is gaining momentum. While one group of writers is trying to assimilate the existing knowledge into an organized framework, another is providing additional raw materials for further refinement of the subject area. The current rash of "readings" books and collections of essays and the recent activity in exploring organization theory and information technology indicate that the subject area is not even close to leveling off as yet. McGregor is right. If one compares our working materials of today with those of thirty years ago, there certainly is no cause for discouragement, despite the fact that the subject has not as yet reached maturity.

THE PROFESSOR HIMSELF AS A PROBLEM

The final problem to which I should like to refer is perhaps a more thorny one. This is the problem of finding the quality of faculty necessary to integrate this evolving area of the behavioral sciences in a balanced form into the teaching of management. I, too, believe that the business student must be encouraged to seek the fundamentals of behavioral science in the basic university and college courses of these disciplines. But beyond basic fundamentals the courses in social science departments do not bring these disciplines into focus for business administration. This integration, unless left entirely to chance and to the student's ingenuity, must quite likely happen in the school of business. If, as I believe, integration is desired rather than displacement of previous concepts, the orientation of the professor must still remain basically administrative if he is to stay in touch with the business student. But he must have the capacity to bring into this administrative framework all the romance and excitement that now is found in behavioral science research.

The dramatic approach to this problem is one of complete reorganization of business schools. This was advocated recently by Richard F. Ericson, of The George Washington University, in the following words:

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[4] See Davis, Keith, *Human Relations in Business*, New York, McGraw-Hill Book Company, Inc., 1957, Chapter 2.

[5] See Argyris, Chris, *Personality and Organization*, New York, Harper and Brothers, 1957.

> It is difficult to avoid the conclusion that compartmentalization of knowledge for purpose of analytical convenience has tended to result in faculties which are all too mentally departmentalized. This inevitably has led to organization structures reflecting academic jurisdictions and vested interests. But an integrated, holistic view must somehow be achieved. The block to effective education for business leadership created by narrow functionalism must be eliminated.
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> * * * * *
>
> . . . Business school faculty organization should emphasize co-operation rather than competition. It should promote activity fostering conceptions of interdisciplinary interdependence. It should implicitly urge each faculty member to think in terms of general responsibility for the final product.
>
> * * * * *
>
> . . . Instead of the functional department, the basic organizational unit would be the multi-disciplinary group. The total faculty of a school would then comprise several of these semi-autonomous yet complete and structurally integrated educational units. Each such group would possess a combination of professors from academic disciplines which were both complementary and supplementary for the purpose in view. Each would provide for the assigned student the core of his synoptic experience in business administration.
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> * * * * *
>
> . . . Much behavioral research has demonstrated the determinative role played by physical juxtaposition and propinquity. Interaction among faculty members who are on the same faculty "team" but whose major areas of primary interest substantially differ may be considerably heightened and strengthened by office and conference arrangements which emphasize the group as an integrated educational entity.[6]

Professor Ericson states a commendable ideal. But faculty members, too, are human and few of us have the moral courage to rise entirely above our own vested interests or the ability to perceive the total educational process from a perspective that really puts our own specialty in proper focus.

Another somewhat radical solution to the faculty problem, but perhaps temporarily a necessary one, is to introduce the pure behavioral scientist into the business school environment in some form of temporary position of lecturer or resident professor of behavioral science. Although this is quite a dramatic recognition that something must be done, it places a difficult burden upon this visiting professor of behavioral science. In addition to the difficulty of enticing a topnotch pure scientist away from the security and comfort of his specialized environment, it is doubtful whether he alone can make much headway as a missionary in an alien environment. He faces not only the aforementioned problem of a language barrier, but a much greater handicap in that his frame of reference is unlikely to be the point of view of business administration and its objectives. Except perhaps for some kinship with select graduate seminars and graduate faculty, the visiting professor may be doomed to be a status symbol for the school, an expensive exhibit as far as most faculty and students are concerned; socially, he may even be an isolate. There just are too few of the behavioral scientists who can play the role of "science interpreter" for schools of business.

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[6] Ericson, Richard F., "The Growing Demand for Synoptic Minds in Industry," *Journal of the Academy of Management*, Vol. 3, No. 1, April 1960, pp. 38-39.

I am convinced that our problem of integrating behavioral science and management is and will remain a problem for the business school faculty to resolve. The immediate solution will be found in taking full advantage of the abilities and interests of existing management faculty, in encouraging them to venture beyond the confines of the business school, and in establishing, re-establishing, or strengthening ties with the faculties and facilities in psychology, sociology, anthropology, and other related disciplines. If our experience in most schools concerning the degree to which the business subject area kinship with economics has promoted mutual co-operation is any indication of the problems involved, the anticipation of a honeymoon with social science may seem exciting, but the chances of a successful and happy marriage are remote.

Once again, therefore, the initiative for the promotion of behavioral science in management must come from the management faculty. Fortunately, opportunities for the development of existing management faculty into teachers of applied behavioral science are becoming plentiful. Not only is the body of literature developing, but postgraduate educational fellowships are becoming more abundant, and special centers of study, such as the Western Management Science Institute, will continue to create a favorable environment and climate for such study and research.

It seems to me, however, that the real hope for behavioral science and management rests with the new generation of doctoral candidates. This future business school faculty must not only be encouraged, but must actually be required to obtain its perspective for business education from a broader base than the traditional functional areas of business administration coupled with a frequently painful excursion into an unsympathetic environment of economic theory. This means that any trend for the business schools to be tempted to "go it alone" and to give up attempting to collaborate with the graduate divisions of economics and the behavioral sciences must be systematically reversed. Neither can effectively operate in isolation. To the extent that the business schools need the resources of the social disciplines more than these social disciplines need the resources of business schools, is it important that the first move toward greater co-operation be made by business school faculties themselves.

Fortunately the economic problem of research funds and research facilities seems well on the way to solution. Our challenge lies in finding people who are capable and motivated to use them well. The opportunities for further integrating behavioral science and management are emerging rapidly. The challenge to face up to these opportunities should make the teaching of management in the next decade both exciting and rewarding.

Management and the Electronic Computer[1]

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EARLY IMPRESSIONS OF THE COMPUTER

In 1951, when the electronic computer was first announced for commercial purposes, management began to study its potential for business data processing, decision making, and control. It was soon hailed as the greatest management tool ever invented.

Some people saw the computer being used primarily for scientific business purposes. Workers in operations research perceived that the ability of the computer to perform rapid calculations would permit the actual testing of complex mathematical models. Before the computer was available, advanced quantitative methods had been kept primarily at the discussion stage because of the time and cost involved in using real data for more than crude versions of the models. In some companies, such as the large oil companies, where the spirit and practice of automation and control were already part of executive life, it was not long before computers were actually being employed for scientific management methods.[2]

For the vast majority of companies, however, the years of experience with qualitative rather than quantitative management methods, the scarcity of reliable data for models, and the needs and costs in the paperwork areas forced executives to turn to the computer for processing routine data.[3]

The initial impression was that all basic company data could be transformed to punched cards or to magnetic tape and the computer could then not only process the routine data but could also produce many kinds of reports. This performance by the computer was supposed to eliminate the need for the clerks in the departments involved. It was expected that the cost savings would increase over-all profits. The

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[1] See also Richard N. Schmidt, "Electronic Data Processing from the Management Viewpoint," *The Journal of the Academy of Management*, August, 1958, pp. 23-33.

[2] As examples, both Shell and Esso have some 30 computers each. Most of the work performed is in the area of mathematical models.

[3] In 1958, at a meeting of users of Univac I and II.systems, a survey revealed that over 90% of the utilization of computer time was for routine business purposes. It should, of course, be pointed out that these computers were specifically designed for business problems although they can also handle scientific work.

outcome was to be one in which the routine business would be taken care of automatically while the executives directed the company by information contained in an increased outflow of management reports. Many people believed that changes and revisions in the work the computer performed could be accomplished at little cost by programmers who would merely have to press a few buttons or make simple adjustments in the instructions.

It was with high expectations that executives in company after company were encouraged to authorize the installation of computers. As was to be expected in anything so new in concept, there were many people in management who developed pessimistic prognoses toward the computer. However, it was not long before actual demonstrations proved that the computer could handle mathematical models, could perform routine data processing, and could increase the flow of management reports.

Nevertheless, management gradually began to realize that there was nothing of intrinsic value in the computer as a piece of equipment and the mere fact that it worked from a technical standpoint was no guarantee of spectacular cost reduction. In some isolated instances there were excellent and even spectacular computer applications. But by and large, in the cases in which computers were used for business data, the processing costs *rose* instead of falling.

COST

The picture of cost and the computer from the management viewpoint may be seen in Figure 1. Data processing cost is shown as a function of time. The curve CC_1 represents real cost under the assumption of no change in method and equipment. Curve CC_2 represents real cost under the assumption that a computer is installed at time t_c. Curve CC_3 represents the pattern generally used by management as a base for cost comparison after a computer is installed at time t_c. Finally, curve CC_4 represents management's idea of what should happen to cost if a computer is installed at time t_c.

From this diagram it is evident why management felt that the computer failed to save money. They desired the cost savings gap as shown between C_oC_3 and C_oC_4. When they measured cost changes after time t_c, they generally found the cost increase in the C_oC_2-C_oC_3 gap. The thing that few executives attempted to measure (if even it were possible) was the real cost savings indicated by the area between C_oC_1 and C_oC_2.

The notion of the failure of the computer was emphasized by examples of some companies whose business success declined despite the fact that computers were used for mathematical models and scientific research. In the case of a large feed company a computer was utilized for linear programming to minimize the cost of preparing various formulas for feed mix. Despite this use the company went into bankruptcy. In another case the fact that an airplane company had a large scientific computer did not halt its decline to the point at which it had to be absorbed by another company. The executive attitude toward computers was further intensified in the mid-1950's by the actual inability of some equipment to do the work for which it was designed.

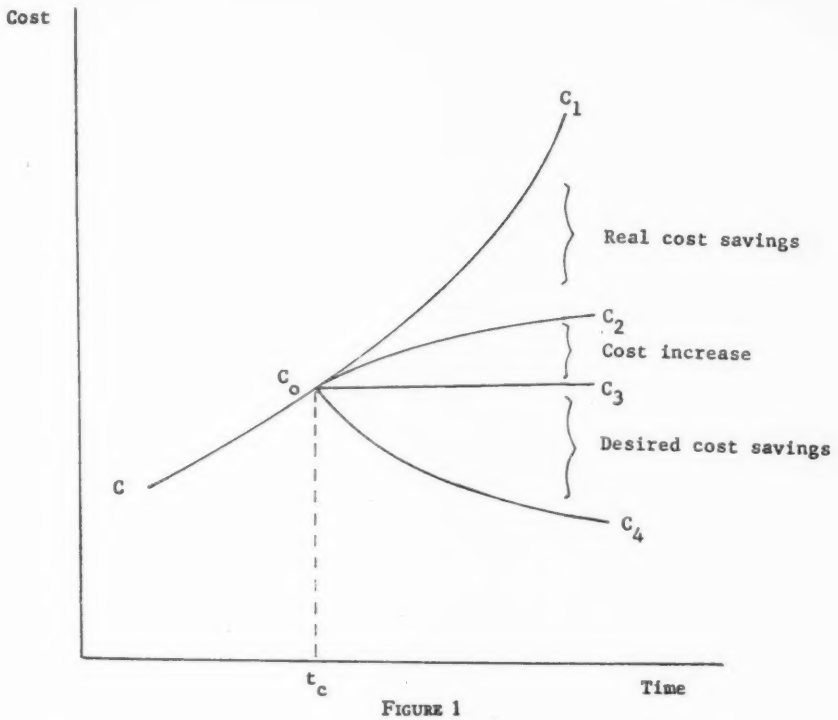

FIGURE 1

The high-water mark in management's apparent disenchantment with the computer was reached about 1957.[4]

BASIC KNOWLEDGE IS REQUIRED

Despite the failures, the higher costs, the pessimistic attitudes, the hostile department heads, and widespread dissatisfaction with the computer, the executives who studied it in detail and thus came to understand its concept and logic were convinced of its potential both as an aid for management and for cost reduction. These same executives also realized that the potential was doomed to remain untapped until more people throughout the various levels of management in the company were able to study the computer.

The reason computers had appeared to have failed was not the lack of competent progammers nor the lack of new terms such as "information retrieval." Nor was it

[4] The general tone of the theme is reflected in the following two articles: Ralph F. Lewis, "Never Overestimate the Power of the Computer," *Harvard Business Review*, September-October 1957, pp. 77-84, and Perrin Stryker, "What Management Doesn't Know Can Hurt," *Fortune*, November 1957, pp. 153-155, 284-289.

the lack of automatic programming methods, such as COBOL, or the lack of new developments such as optical scanning. Rather, the apparent failure of the computer was due to management's own failure to learn and understand the fundamentals of the computer and its business uses.

To the present day, executives exhibit a wide spectrum of attitudes toward the computer: Some are openly defiant; some are afraid of it; some are mystified; some profess conservatism; some appear to be unaware of its existence; some are cooperative; and some are informed and make wise decisions concerning its use.

In the early days it was believed that only young graduate mathematicians could understand programming. For this reason most of the first business applications were under their direction. It was later discovered that ability to code is not sufficient for business use of the computer but that a knowledge of the business—its objectives, policies, methods, and procedures—is equally vital. Although only management people possess such knowledge, they generally do not know enough about the computer to give the programmers the right information. On the other hand, the programmers are not sufficiently familiar with the business data to ask the right questions.

In recent years it has been demonstrated that company executives can indeed learn to program without undue difficulty. As more members of management acquire a basic knowledge of the computer, the renewed belief in its potential is becoming more widespread. On the one hand, management's plans and decisions give recognition to the importance of the role played by the computer in routine business data processing; on the other hand, integrated data systems that will permit quantitative management controls are becoming the goal of computer utilization in advanced companies. An abstraction of this concept is given in Figure 2.[5]

CONTROL USE OF THE COMPUTER

The symbol at the top left represents the total of management personnel throughout the company. The symbol on its immediate right represents the entire set of company objectives, policies, methods, and procedures. This set can be visualized as an "administrative blueprint" giving all specifications and tolerances required by management in their planning, organizing, directing, and controlling functions.

The administrative blueprint becomes the basis for developing the source documents and the derived documents which form the paper matrix of the data flow system that constitutes the core of the administrative function.[6] The diagram shows these documents as being derived from the administrative blueprint. Next along the solid line is the symbol that represents the conversion of the data from the format on the documents to a format that can be interpreted by the computer. At present the bulk of this conversion is through human effort by which the data are converted to

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[5] Recognition is given to Mr. William E. Meyers, Management Services Division, Ernst and Ernst, for his contribution to some of the ideas in the diagram.

[6] The "paper flow" system is often considered apart from the "data flow" system under manual or mechanical data processing. Under computer processing both tend to merge.

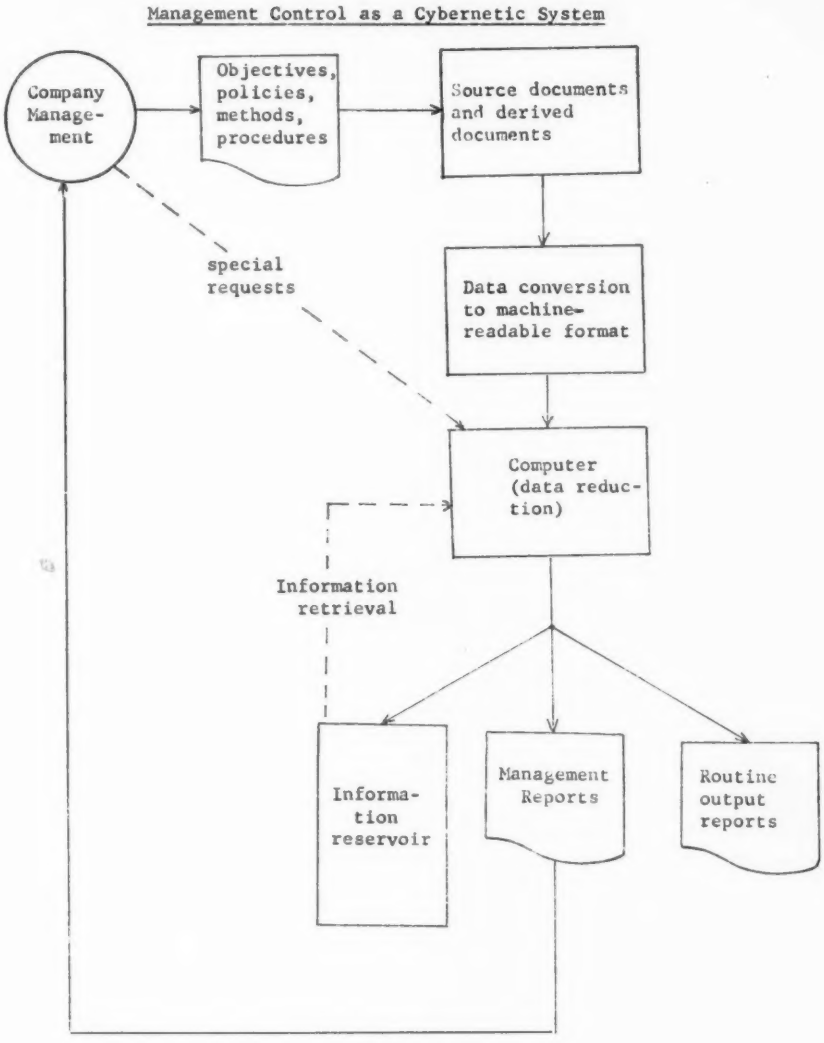

FIGURE 2

punched cards, paper tapes, and magnetic tapes. For the future it appears that this human effort will be greatly reduced by developments such as optical scanning devices which automatically convert data to the language of the computer.

Nevertheless the concept shown in the symbol for data conversion will remain unchanged. This specific example is cited mainly to point out that the general theory

of management use of computers is little affected by the advances in equipment design. Basic management concepts of electronic business data processing will probably remain as shown in the diagram until a new advance overshadows the computer.

The next symbol represents the data reduction function of the computer. Included in this function is all of the calculation, sorting, processing, manipulation, testing, and handling of data required of the equipment in accomplishing the task of transforming input data configurations into output data configurations.

Three symbols are shown as receiving computer output. The one on the right represents routine output reports, such as pay checks, invoices, and W-2 tax-withholding forms. Of course, such output has little implication for management. Yet this statement is not meant to belittle the importance of the output. Quite the contrary is true. For, if the flow of routine reports is interrupted, there can be serious and immediate consequences that can threaten the life of the company. However, there is little decision-making or control information in these routine outputs.

The reports represented by the middle symbol are of continual importance to management because they are designed to yield information regarding actual company performance compared with the specifications set forth in the administrative blueprint. The timing and variety of these reports depend on the information required by executives for continual control of the company. Some reports would be financial, such as income and position statements, while others would be based on data that are less directly related to financial matters, such as quality control reports, inventory reports, and efficiency reports. The solid line connecting these reports to management is drawn to symbolize the feedback of information so it can be used for decision making and control, especially in cases in which significant variations occur. Thus the computer becomes a key factor in business management as a cybernetic system.

In the future, as management become more accustomed to quantitative control methods, it is likely that these management reports will undergo important structural changes and will be based more on mathematical models than on complete listings of individual control items. Moreover, the computer will be programmed to perform most of the evaluation of results and will report only those figures that differ significantly from estimations and tolerances built into the models. The result will be a noticeable reduction in the size of the reports accompanied by a great increase in the *information* (as opposed to data) that they contain. For example, the typical sales analysis consists of page after page filled with primary and derived data, most of which is meaningless in its present form. The executive who desires to evaluate performance is obliged to look at thousands of figures to try to determine whether they convey some information. Possibly a simple or multiple regression model could, for example, be used to evaluate the entire set of data. The computer could reduce the data to a simple graph and to a single list of the figures that differ significantly from the model. It is this ability of the computer to make logical decisions that permits such management control techniques. The method would be uneconomical under manual or mechanical systems.

The symbol labeled "information reservoir" represents one of the latest refinements of the management control concept. The central idea is to store basic

information in primary, derived, distribution, and model forms in a medium, such as magnetic tape, so that the computer can easily retrieve it and use it in the preparation of non-routine management reports. As an example, consider the case of vendors and their delivery performance. In few companies is such information readily available. Yet, in a computer operation it would be a simple matter to accumulate delivery data. When management desires to build an inventory control model, estimates of parameters for delivery performance become very important. If appropriate data are in the information reservoir, all the executive would have to do would be to request a special report of delivery performance. The computer could then be programmed to retrieve the information required and the report would be sent to management. This procedure contrasts with the present method in which it is necessary either to make crude guesses as to vendor performance or to spend considerable time trying to construct a suitable sample to obtain the data.

Under such a system, effective business control will require management to consider the potential contents of such an information reservoir and then to specify exactly which data will be kept and the forms in which they will be stored.

IMPLICATIONS

The implications of the comments in this paper are that managers of the future will tend to combine more quantitative evidence with their qualitative reasoning; that reports will be based on mathematical models and will be designed to present only significant variations in data rather than complete listings; and that managers will have to specify not only the reports to be issued on a current basis, but will also have to plan the structure and the content of the information reservoir. Finally, for effective business use of the computer, management will have to regard the company as an integrated information and control system rather than as a series of isolated administrative departments.

*Administrative Science and the Role of Value Judgments**

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INTRODUCTION

Confusion, controversy, and disagreement characterize any new and growing area of study. Also true of a relatively new field of inquiry are the efforts of both theoreticians and practitioners to compartment, isolate, or delimit the area of study as distinct from other specialties. Another characteristic which adds to the confusion is the attempt to formulate a separate "general theory" or "science." These characteristics are especially true for the so-called field of administrative science.

One of the objectives of this paper is to clarify some issues about administration as a field of inquiry. The more important purpose is to provide a setting for the development of administrative science. However, the purpose is qualified by the premise that administration is only one of the interrelated parts of a total social science, and its study is justified only insofar as it contributes to the whole understanding of human behavior.

CURRENT CONTROVERSY

There are those who feel that administration is not a science and can never be a science. For example, R. D. Calkins, President of the Brookings Institution, stated in 1955:

> Administration is fundamentally the direction of affairs. It is purposive action and to an increasing degree it is informed, rational, and deliberate action. It draws upon the knowledge of the physical sciences and the practical arts, it employs the knowledge and techniques of the social sciences; but it is overwhelmingly concerned with the choice of ends, ways, and means for the attainment of desired results. It is curbed by moral codes and ethical principles, it is driven by springs of ambition and devotion that largely escape analysis.
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> The process requires the use of knowledge and understanding, but the ultimate objective is not explanation and understanding as it is in science. Its goal is not knowledge for knowledge ['s] sake. Nor is its end any intellectual quest for joy of dis-

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* This paper, in slightly different form, won a prize recently in a contest sponsored by the Comité International de l'Organization Scientifique on the occasion of the XII CIOS World Congress. Submitted to the CIOS under the title, "The *Raison d'Etre* of Administrative Science," it was selected as runner-up and placed as one of the six best of all entries received from 29 participating nations and 120 entries.

> covery. The end of administration is the achievement of purpose; that purpose is action which yields desired results. Administration is inescapably concerned with choice and action, and it therefore is concerned with the future consequences of action.[1]

On the other hand, there is strong belief among academicians and practitioners that administration has scientific foundation. Such men as Charles A. Beard, Chester I. Barnard, Herbert A. Simon, and L. Urwick have made great contributions and have vociferously advocated a Science of Administration. In fact, Beard has asserted that the future of modern society depends on the development of administrative science:

> "The future of civilized government and even, I think, of civilization itself rests upon our ability to develop a science and a philosophy and a practice of administration competent to discharge the public functions of civilized society."[2]

In addition to this basic controversy regarding administration's qualification as a science, there is confusion and disagreement over concepts and terminology. Consider the controversy that exists about such concepts as: "span of control" and "excessive scalar levels"; authority, responsibility, accountability, decentralization, and divisionalization; line and staff; decision-making and problem solving; and formal and informal organization.

Also, similar to the experience of other sciences, administration is undergoing the pains of growth. There is, indeed, little doubt that the study of administration is in the embryonic stages. And while the students of administration are still learning to crawl, clumsily striving for recognition in a sophisticated world, the critics, in the role of impatient parents, bemoan infantile behavior and howl for more progress: "We want a science of administration, a 'General Theory' of Administration, a philosophy, more logic and objectivity."[3] Nevertheless, the criticisms and the controversy have been both stimulating and healthful. They have given birth to several outstanding periodicals and some significant research. But although some real progress has been made, the study of administration still lacks the theoretical development and the extensive research and verification that is necessary for science. Administrative science—to gain any degree of sophistication—must constantly undergo the time-consuming process of evaluation and re-evaluation. Critical review and research are the bulwarks of scientific development.

AS A FIELD OF STUDY

Unquestionably administration plays an important role in society. The increasing complexity of society and its growing interdependence require administration of high order. Its significance has been characterized as follows:

> Every enterprise in the Great Society, as well as the Great Society itself, rests upon administration. Industry on a large scale depends upon organization—upon the manage-

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[1] Speech before a meeting of the American Association of Collegiate Schools of Business, Milwaukee, Wisconsin.

[2] Charles A. Beard, "The Role of Administration in Government," *The Work Unit in Federal Administration* (Chicago, Public Administration Services, 1937), p. 3.

[3] For example, see Edward H. Litchfield, "Notes on a general Theory of Administration," *Administrative Science Quarterly*, Vol. I, No. 1 (June, 1956), pp. 1-29 and Louis A. Allen, "Wanted—A Science of Management Organization," *Advanced Management*, Vol. 24, No. 1 (January, 1959), pp. 21-24.

> ment of large numbers of employees of different crafts and arts and the disposition of material goods. In some industries the administrative organism is national and even international in its range. Thousands, hundreds of thousands, of men and women must be brought together and distributed among various departments of production. They must be graded in a vast economic hierarchy, with skilled engineers and managers at the top and simple day laborers at the bottom. They must be assigned specific and appropriate tasks in the operation of the organization. They must be directed, controlled.
>
> The state in the Great Society, like the private corporation, also rests upon administration.
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> * * * * *
>
> So, whatever may be the future, the science of administration will be an essential instrument of human welfare.[4]

Fundamentally, then, the universality and the necessity for the administrative function underlie its importance in society. It is a necessary part of any group endeavor, whether it be the church, state, school, hospital, or industry.

Administration involves those processes that motivate group behavior toward the effective and efficient accomplishment of desired goals. It requires an understanding of human behavior and the processes necessary to co-ordinate this behavior toward the most economical accomplishment of objectives. In other words, although the administrator is characterized by his ability to gain a group's willing co-operation toward the accomplishment of a goal, this is not enough—the objective must be attained in the most efficient and effective manner. Once objectives have been established, effective and efficient performance becomes paramount. This, of course, recognizes the necessity for communication, decision-making, and co-ordination of action. It requires that the administrator possess the analytical skills to isolate and solve problems and the leadership necessary for motivating human behavior.

If administration is so integral to the conduct of human affairs and if it is necessary in any group endeavor, then it follows that the understanding of human behavior and the development of analytic skills can be validly undertaken in formalized study programs. Furthermore, it may be argued that administration is justified as a *general* area of study. Some writers have said that the present practice of colleges and universities to study administration in the several subject areas, such as public administration, hospital administration, and business administration, is wasteful. It has a stultifying effect upon the development of a science of administration.[5] To secure the educational, scientific, and professional status, therefore, the study of administration requires that contributions of educators and practitioners be channeled toward a greater understanding of the general area and ultimately toward a better understanding of the total of human behavior.

AS A SOCIAL SCIENCE

One attribute of administration which characterizes it as a social science and distinguishes it from the natural sciences is that it is concerned with purposive

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[4] Charles A. Beard, *Public Policy and the General Welfare* (New York, Farrar and Rinehart, Inc., 1941), pp. 148 and 159.

[5] For example, see Edward H. Litchfield, *op. cit.*

human behavior which is dependent upon uncertainty, expectation, and contingency. Human behavior is purposive to the extent that it seeks to achieve objectives. Thus, purposive behavior involves selections from alternatives, from those courses of action which permit goal accomplishment. Since these decisions preface action, assumptions must be made about the future. Every decision is made with some estimation of the future—implicitly or explicitly, consciously or unconsciously. What participants in an organization expect of other organization members or perhaps of competitors in a market place or of a union will influence their behavior. On this point Charles Beard has said:

> . . . The subject matter of the social sciences differs from that of the natural sciences, that is, in presenting to observation the appearances of contingency, chance, and choice in changing affairs. Newton's apple does not fall to the ground at one rate today and another rate tomorrow. The combination of hydrogen and oxygen in proper proportions does not make water today and pea soup tomorrow. . . . The natural scientist can be absolutely neutral; he is not called upon to decide whether water *should* normally run uphill or down.
>
> On the other hand, the human beings observed in their varied activities and relations . . . appear to have the capacity of willfulness, of choosing among many things and courses. If the social student could make himself truly neutral about human affairs, still those affairs would continually reveal to him the appearances of choices that have been made and that may be made now, tomorrow, in the indefinite future.[6]

ADMINISTRATIVE SCIENCE AND VALUE JUDGMENTS

Another attribute of administration which makes it a part of social science and distinguishes it from the natural sciences is its concern with values. Any description of human behavior would be inadequate without reference to the part that values play in influencing that behavior. Informal social arrangements, for example, have their genesis in the beliefs, ideas, likes, dislikes, social customs, and sentiments of the members of the group. These informal groupings are natural phenomena which stem, among other things, from man's basic desire to associate. Because these informal arrangements satisfy basic human wants, they are necessary for cooperative effort and are proper for study.

A science of administration must also be concerned with values in the decision-making process. However this view is not currently popular. Indeed, Simon has asserted that value judgments or decisions which involve ethical elements have no place in science:

> . . . An administrative science, like any science, is concerned purely with factual statements. There is no place for ethical assertions in the body of a science. Whenever ethical statements do occur, they can be separated into two parts, one factual and one ethical; and only the former has any relevance to science.[7]
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> Factual propositions are statements about the observable world and the way in which it operates. In principle, factual propositions may be tested to determine whether they

[6] Charles A. Beard, *The Nature of Social Sciences* (New York, Charles Scribner's Sons, 1934), pp. 7-8.

[7] Herbert A. Simon, *Administrative Behavior* (New York, The Macmillan Company, 1957), p. 253.

> are *true* or *false*—whether what they say about the world actually occurs, or whether it does not.
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> The question of whether decisions can be correct and incorrect resolves itself, then, into the question of whether ethical terms like "ought," "good," and "preferable" have a purely empirical meaning. It is a fundamental premise of this study that ethical terms are not completely reducible to factual terms.[8]

Simon's argument raises two important questions. First, there is the apparent question of whether or not administrative science can validly include the ethical element. Secondly, Simon's point that there is no way in which to empirically or rationally test the correctness of ethical propositions raises some questions about method and thought in administrative science.

Certainly decision-making involves choice among alternatives to achieve objectives. However, Simon's analysis implies that the ends justify the means. He seems to say that regardless of the means employed, so long as they contribute to the attainment of desired results they are proper for inclusion in administrative science. This view typifies what is meant by the neutral position in science. It makes science devoid of such human values as dignity, freedom, morals, and ethics.

Would the study of administration be adequate if it did not recognize that administrators were influenced by value considerations in their decision-making? Are administrators concerned with such value considerations as employee health, welfare, security, and safety? Are administrators concerned with ethical practices? Are they concerned with human dignity, freedom, and morals? If not, their public pronouncements are false and the research done on the subject is invalid.

Perhaps it would be more to the point to ask whether an administrative science should prescribe value judgments. In this respect administrative science can be likened to medical science. Both medical scientists and practitioners accept a set of values based on life preservation. This value consideration limits their activity, of course, but also serves as a powerful spur to their endeavors.[9] Administrative science must likewise be concerned with human values. It must be guided by a set of values that are based on the most intelligent and judicious use of the human resource. Human welfare, health, freedom, and dignity are appropriate considerations for administrative science. The laws of the land specify the minimum requirements—for example, laws that regulate the employment of women and children in industry and laws pertaining to industrial relations and to health and safety—but administrative science must go much further to include all the values that affect interpersonal relations.

Values change over time, of course. But this does not preclude their importance or incorporation in administrative science. On the contrary, it signifies the very nature of the science and the difficulties of formulating its concepts. While it may be cumbersome to handle value judgments, the study of administration is inadequate without it. Beard explains the necessity as follows:

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[8] *Ibid.*, pp. 45-46.

[9] On this point see James B. Conant, *Science and Common Sense* (New Haven, Yale University Press, 1951), pp. 344-345.

> The social scientist may declare, if he wishes, that he will ignore this continuous process of valuing or choosing that goes on in society, which makes for the change of culture by discarding the old and adding the new, but by his declaration he merely shuts his eyes to a large part of the "data" of his field, essential and determining data.[10]
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> * * * * *
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> Human desires, interests, hopes, admirations, dislikes, and resentments will not disappear because social scientists refuse to take them into consideration and ostentatiously decline to express any opinions respecting them.[11]
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> * * * * *
>
> It cannot be denied that making such value judgments and decisions in many departments of life—family, economic, and political—is hazardous business. The good or better setup by one person may be denied or trampled upon by others; or the course chosen may produce unexpected or undesired results. Nevertheless, in such hazards is life entangled; and nothing is gained by refusing to face the facts.[12]
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> * * * * *
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> The social sciences, then, are ethical sciences. As ethical sciences, they are concerned with good or better conduct and good or better material and social arrangements.[13]

SCIENTIFIC DETERMINISM AND THEORY

Administration as one of the social studies lacks the scientific determinism characteristic of the natural sciences. For this reason, some have argued that administration or any social study cannot be classified validly as a science; that it lacks the deterministic schemes and sequences of action that permit prediction; that unpredictability of human behavior prevents formulating principles and laws of such behavior; and that without principles and laws, a general theory of administration is impossible.

Most of the subject matter of administration derives from psychological and sociological acts. It is concerned with goal accomplishment through human effort. Administrative study embodies all the individual and social phenomena that influence human behavior. Although these phenomena may—at least at this stage of man's comprehension—be unintelligible to scientific mechanisms, such as mathematical schemata, neither their scientific foundations nor administration's qualification as a science are thereby invalidated. Since human behavior is determined by so many diverse influences, it is impossible to develop immutable formulas and laws of the type developed in such fields as chemistry and physics.

Furthermore, clean-cut divisions into administration, economics, politics, and sociology are physically impossible. Charles Beard, using the definition of natural science employed by E. W. Hobson, has put the problem as follows:

> . . . A real science, in order to make a science out of data, must have a system of data and all the relevant facts in the system. Then all the positions, properties, qualities, and mutual relations which constitute the state of the system must be capable of complete

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[10] Charles A. Beard, *The Nature of Social Sciences, op. cit.*, pp. 39-40.
[11] *Ibid.*, p. 42.
[12] *Ibid.*, pp. 43-44.
[13] *Ibid.*, p. 44.

specification by a set of finite numbers. From a portion of the sequences under observation, in time it can tentatively predict what will happen.

In the social sciences, clean-cut divisions into economics, politics, and sociology are physically impossible. The possibility may be asserted in words, troublesome variables from neighboring regions may be arbitrarily eliminated in words, but clean-cut isolation, as in a chemical or physics laboratory, does not correspond with the real social world, and the operation of effecting such an isolation in reality is beyond any method known to the human mind.

Moreover, owing to the development of human experience, men and women as individuals, and as groups, races, and nations, are always growing and changing, so that in the realm of complex human relationships, patterns of individual and social ideas and interests are not repeated in time with that exactness found in the sequences of physical nature. Hence any division of cross-sectioning of human affairs is arbitrary and artificial and can only be justified by convenience and recognition of the impossibility of grasping the whole scheme entirely.

Not only is it impossible to isolate divisions of the social sciences, as the chemist does his materials; it is impossible to express all the actualities, with which any one of the social scientists deals, in the mathematical terms which are absolutely indispensable to operation in each field of natural science. If anything is known at all, it is that all the facts or data of the social sciences or of any one of them cannot be brought within a scheme or closed circle of deterministic sequences or completely specified by finite numbers. Many of them may be expressed in mathematics but there are also within the actualities of the social sciences, ideas, aspirations, preferences, and choices—data that do not appear in the materials of the natural sciences--data that cannot be characterized mathematically.[14]

Speaking summarily, it is not valid to speak of a "general theory of administration." The diverse influences which determine human behavior are so broad and varied that their isolation in one field of study is precluded. The very nature of administration—its concern with values, preferences, ideas, aspirations, and the ever-changing aspects of human behavior—negate the possibility of developing deterministic schemes and systems so necessary for a "general theory."

CONCLUSIONS

It is the task of administrative science to describe, explain, analyze, and predict human behavior as it relates to the accomplishment of organization goals. Administrative science is concerned with efficient and effective accomplishment of organization goals. However, the efficiency criterion must be tempered, for the most efficient accomplishment of objectives might conflict with the most judicious and intelligent use of the human resource. There must be consideration for such values as human dignity and the right of group members to participate in decisions involving their working conditions. A science of administration does not in any way imply indiscriminate use of the human resource.

The complexity and variability of human behavior preclude the attainment of precision that is characteristic of the physical sciences. The social scientist studying administration must content himself with observation and relatively inaccurate descriptions of cause and effect. Administrative science to the administrator is like

[14] *Ibid.*, pp. 25-26.

medical science to the medical practitioner: administrative science serves as a basis for understanding human behavior and for selecting that course of action which permits attainment of desired results through intelligent use of given resources. The goal of administrative sciences is not limited to the accumulation of knowledge for its own sake. In the words of the Encyclopaedia of the Social Sciences, science includes the purpose whereby:

> man may envisage the future course of phenomena unrolling themselves or capable of unrolling themselves before his perception and on the basis of which he may alter future arrangements of phenomena to suit his practical interests. Science may be defined as a far-flung system of knowledge couched in terms which allow it to serve as a theoretical basis for practical technique.[15]

The argument for exclusion of value elements in science is based on the fact that their inclusion prevents conceptualization of mechanistic cause and effect sequences—that the absence of deterministic sequences prevents accurate prediction. And the argument continues with the assertion that since ethical propositions cannot be empirically or rationally tested, their correctness cannot be determined.

The existence of value elements in administrative behavior is, of course, indisputable. But the value characteristic, like other characteristics of social science, is not directly observable to the degree that phenomena are viewable and traceable in the physical sciences. Nevertheless, value judgments—be they aesthetic, intellectual, or moral—are a reality, constituting, in fact, the larger part of the spectrum of human behavior. It would seem, moreover, that the very acknowledgment of their existence makes mandatory the pursuit of truths in administrative science that will embrace such human values. In essence, these values are *fact* in any behavioral science. The argument that since their existence cannot be verified by empirical tests, their existence is nullified in science is merely an admission that the human mind either lacks or has not yet developed the ability to isolate, trace, and test the cause and effect function of the value elements in human behavior. An element which is the basis for an explanation of human behavior cannot be excluded from science simply because the phenomena which describe it are difficult to handle.

The social scientist generally recognizes the difficulty of expressing all of the influences on human behavior. For the sake of manageability he holds other social arrangements constant: under the assumed *ceteris paribus* conditions, the selection of a particular alternative will produce certain results. In so doing he recognizes also that it is impossible to explain the total of human behavior in separate disciplines such as economics, politics, sociology, or administration. Clean-cut isolation is not in accord with social reality. While concentrated study in each of various fields such as economics, sociology, and administration is acceptable and desirable, the social scientist must constantly bear in mind that human behavior is subject to many diverse influences that, despite their diversity, are so interwoven and interdependent that explanation expressed solely in terms of economic or purely administrative motives is invalid.

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[15] *Encyclopaedia of the Social Sciences* (New York, The Macmillan Company, 1935), Vol. XIII, p. 591.

Reorientation of Management Education

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Catalogs of schools of business and textbooks on industrial management have long emphasized the top management point of view: "We seek to develop long-range, corporate-wide thinking." "We are not interested in the problems of foremen. We teach our students to analyze and to solve the problems of the corporate high command." Indeed, scarcely a textbook touches on any problem likely to be "handled" below the vice presidential level. Case after case requires students to ponder half a dozen pages of carefully disorganized data and, in an hour or two, make and defend decisions which in real life would occupy the major attention of a team of seasoned executives for many weeks.

Some students wonder about how they will reach the exalted positions in which they can use these decision-snatching abilities. And they wonder how much of their educations will still be on tap after the years of erosion during which they make their unaided scramble up the ladder of success. They may even wonder whether their education, even if retained, will not be pretty obsolete by the time they reach the ranks of the higher command. Meantime, prospective employers may wonder what the colleges expect them to do with all these inexperienced vice presidents. Of course, teachers may derive a vicarious thrill from the ease with which they can arrive at major decisions which baffle mere boards of directors, and they may take secret comfort from the fact that these quick, easy, and omniscient solutions will never be put to the test of application.

It seems to me that these objectives of schools of management are at once too pretentious and not ambitious enough. Instead of preoccupation with such top-management spectaculars, we should concern ourselves with the *approaches* to managerial problems—to all kinds of managerial problems—at every level of every chain of command. We should seek to develop approaches as valid for the problems of a chief stockroom clerk or of a methods engineer as for an executive vice president. If we can find systematic analytical tools for dissecting, analyzing, and solving managerial problems of planning, organizing, and controlling enterprise operations suitable for all levels of all chains of command, we shall have appropriate materials for an education in preparation for careers in management—an education valid for our students from their commencement to their retirement. This we can do. Many of the materials are even now available.

THE ROLE OF TOOLS

This approach places the emphasis on how managers should go at their problems rather than on the problems themselves. Problems continue to provide motivation, and to give exercise for sharpening the tools. But the tools occupy the center of the stage; the curriculum should be organized around the approaches and not around the problems. The approaches are largely developed in the basic sciences: statistics, mathematics, psychology, law, sociology, accounting, engineering. Summary, integrating, terminal courses may properly be problem-centered to give practice in selecting appropriate tools and in bringing many tools to bear on a single problem. This argues that the "functional" courses—production, marketing, personnel, finance—are overemphasized, taking time better spent on fundamentals. Of course, fundamentals can be taught in functional courses, using functional problems as vehicles. However, the tendency for random duplication is very great unless the faculty spends more of its time on co-ordination of offerings than is customary.

One approach, but only one, to managerial problems is the conference, by whatever name it is called: group dynamics, case discussion, brain-storming. Other, often more powerful, approaches are logic (including mathematics), experimentation, field investigation, library research. All are usable on every level of management and in every chain of command. None is particularly the province of top management or of bottom management. Every manager should be able to use each where each is appropriate.

This does not deny salvage value to long-range, corporate-wide thinking. Executive development programs should and do concentrate on this. Participants are already in the upper echelons of the corporate hierarchies or they are rapidly approaching these higher echelons. Moreover, even the most junior managers should develop better solutions to their problems if they remember that suboptimizations should be consistent with higher-level optimizations; that little policies and decisions at low levels should harmonize with big policies and decisions promulgated at higher levels; and that they should not solve their problems in ways that create worse problems elsewhere. They should understand the needs and objectives of other departments and higher echelons in order that their decisions do not have unfortunate side effects.

Given this kind of managerial education, the beginner will find his education a major help on his first job, and he will find that every experience on that job helps him strengthen and sharpen his tools in preparation for tougher jobs on higher echelons. For example, if a clerk desires a new desk calculator, or a typist an electric typewriter, he should be encouraged to work up a request for an appropriation in proper form, spelling out the estimated investment and justifying it in terms of anticipated savings. This approach, universally applied, would result in small improvements in a myriad of small decisions—so many that their total could be of major significance. Moreover, juniors would be developing their powers in patterns of thinking which apply equally well to the senior executive level. When promotions have raised them to senior rank, they will make better decisions as to acquisition of foreign branches, building of new plants, purchase of subsidiary corporations, or development of new product lines.

Similarly, a junior head of an office activity and a supervisor of floor sweepers should be encouraged to think about their inventory problems in the same patterns as those that are used by the vice president of manufacturing to establish reorder levels and purchase- or production-lot sizes of raw materials, piece parts, or finished goods. The junior office manager should work out his reorder levels and purchase-lot sizes for forms, carbon paper, and what not; and the janitorial supervisor for cleaning compounds, paper towels, and dust rags. Again, a myriad of small savings may accumulate to a substantial total. And, again, the most important aspect of this approach may be the training of juniors to make them more effective seniors when their day comes. Given the educational approach of developing tools of analysis—ways of going at problems—our graduates will find their educations pertinent from the beginning, and will never find them obsolete or losing relevancy.

I have damned education that uses any single method as being akin to playing championship golf with only one club. To extend the analogy, persistent concentration on the problems of top management to the exclusion of all else is somewhat like trying to make a hole-in-one on every hole—certainly challenging, but somewhat futile.

Behavioral Science and Business Education

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Both the Pierson and the Gordon and Howell reports recommend the inclusion of "the behavioral sciences" in the undergraduate curriculum in business. The Gordon and Howell report is perhaps stronger in its recommendations than the Pierson report, which may reflect the fact that the Ford Foundation invented the term in the first place.

It would seem that our main task is the relatively simple one of indicating which and how much of the behavioral sciences—that is, psychology, sociology, and anthropology—would be the most appropriate for the undergraduate business student along with a few comments concerning the integration of their concepts, findings, and methods with certain existing business subjects. However, I'd like to take a more radical approach and ask, "Why include the behavioral sciences at all?" And if we do include them, should they be at the peripheral edges of the business undergraduate curriculum or right at its very heart?

Let me begin by pointing out that almost anything has significance to the study of business and the development of administrative competence. Parenthetically it might be added that present trends suggest that almost anything has significance to the study of business except the study of business itself. However that may be, it is obviously difficult to exclude any of the liberal arts and sciences—philosophy, history, the fine arts, English literature, economics, physics, the behavioral sciences, or what have you—on the grounds that it has nothing to do with business. Everything has something to do with business education, and, as a consequence, business education appears to have become everybody's business, including the College English Association's.

The point is that simply because a particular discipline or subject matter has something to do with business is hardly a sufficient reason for its inclusion in the business curriculum. Indeed, this is what is wrong with our business curricula now. We are including as many subjects as possible which appear to have something to do with business and we don't seem to know where to stop. We haven't learned how to draw distinct lines around our subject matter. Recently I told a group of students, jokingly, that I was going to offer a course in managerial metaphysics; several of them came up afterward to inquire when and where the course was to be

[1] Cf. Gordon, Robert A. and Howell, James E., *Higher Education for Business*, Columbia University Press, New York City, 1959.

offered. Frankly, we don't need any advice on what else to include—we need advice on how to limit our offerings.

"ALWAYS BET ON THE JOCKEYS"

But we are not likely to make progress in our thinking if we continue to concentrate on student needs. This may seem a little radical since curriculum-planning is undoubtedly the major activity of business schools today. But a friend of mine, a sporting man, once told me, "Never bet on the horses; always bet on the jockeys." I wish I had heeded his advice sooner. We have not only a horse problem, we have also a jockey problem; and the jockeys—in this case the members of the faculty—may be the most important element in the race. I think it is safe to say that we shall never create a curriculum that is perfect for every student seeking success in a business career. Frankly, if I knew the magic formula, I wouldn't be selling it at university tuition rates.

Our major concern, then, should be with faculty development. If the faculty is right and is concentrating its attention on a reasonably well-integrated and significant subject matter, the students will be all right. They may not be learning all the things that might ultimately be of value to them in their business careers—this, as we have already demonstrated, is impossible—but they will have the opportunity to learn something about our business society, our business institutions, our business problems, and the behavior of executives who run them. Moreover they will be able to learn about these things in an academic climate which sharpens their wits, prepares them for future learning experience on the job, and teaches them the ethics and fundamental morality of scholarship.

AIMS AND STRUCTURE OF BUSINESS SCHOOLS INHIBIT FACULTY RESEARCH

The answer to our problems of upgrading faculty scholarship does not, in my opinion, lie in the easy one that business school faculties are unimaginative and unintellectual. Indeed, I am sure that none of us feels unscholarly or unimaginative or unacademic. After all, we enjoy the benefits of academic life like every one else—low pay, long hours, and the opportunity to pursue pure knowledge from 5:00 p.m. to 8:00 a.m. every day. Moreover, we work hard, beating our brains out on the toughest problems of all, namely, what are the most effective ways of solving the production, personnel, marketing, and financial problems of business. We should have the life of the sociologist who doesn't have to worry with problems like these.

Rather, it seems to me, our problem of improving faculty scholarship lies in the aims and structure of the business schools which force their faculties into particular molds, distract their attention from scholarly pursuits, and make it well-nigh impossible for them to develop integrated research interests.

Let me elaborate for a moment. Our schools have grown up in a tradition of vocationalism; we now call it professionalism since we have upgraded ourselves to the place where we are coping with top management problems instead of the more limited functional specialties. But no matter what we call it, the image of a profes-

sional school forces the faculty into the pattern of trying to tell the boys how to do it, how to make decisions like top executives, how to run personnel departments, or how to market products. The job under these circumstances is to provide answers—but, unfortunately, to provide answers where no underlying science or even commonly accepted artistic convention validates what we have to say. As a consequence, we are thrown back on a collection of commonsensical judgments, descriptive material, folklore, or ideological notions.

This in itself would not be so bad, if it did not limit our research. But in our quest for ultimate answers, we sometimes miss the preceding steps, namely, the collection of data, the meticulous testing of hypotheses, and the development of adequate theories of business enterprise, organization, and administration. We have become a group of armchair philosophers who would find more kinship with the great classical philosophers than with modern social scientists. We toy around with new ideas, new themes, and new organizations of existing materials like Greek cosmologists, but we don't get out often enough and look around. If someone says to me, "What the business schools need is more of the humanities," I say, "That's all we've got—the humanities! We've got the most interesting collection of philosophers you've ever seen."

THE WHOLE BUTCHER SHOP

The best that we have been able to do thus far in the organization of the business school is to break up its subject matter into the functional areas of business—generally representing microcosmic reflections of General Motors with a bit of a management theme thrown in. This structure forces faculty people into more or less unintegrated boxes in which there are no central theoretical concepts, no truly integrated bodies of knowledge, no three-dimensional building blocks which can be piled one on top of the other to build a scholarly structure of theory, methods, and knowledge—only two-dimensional flat planes split up like post-war Europe into East and West zones. Our problem is not one of slicing the bologna thinner and thinner. We've not only taken the whole butcher shop and put it into one course, but—heaven forbid—have mixed the hard salami, wienerwurst, and peppered beef with the bologna. There is hardly a course in the business school which, if it were properly expanded, would not ultimately include all human knowledge. Teaching courses of this type tends to make superficial generalists of our faculty. Their attention is not focused, as it normally should be, on specialized areas of significant knowledge. Indeed, we have arrived at the point where we take pride in our general approach. Thus, we have escaped from the trap of narrow vocationalism: we no longer teach motion and time study, but, like editors and deans, we have projected ourselves into a situation where, if we are not careful, we shall soon know more and more about less and less.

SEEKING ANSWERS VERSUS RAISING QUESTIONS

If, however, we change our focus from that of attempting to give answers to trying to seek an understanding of the nature, dimensions, and processes of business

enterprise, organization, and administration, we shall soon begin to make more rapid progress. It is precisely here that the behavioral sciences are going to be of greatest help to us—and not because they will give us answers. This is one of the great disappointments to the typical business professor who looks to the behavioral sciences. The usual reaction is, "Well, what's so good about these fields? They don't have more answers, if indeed as many, as we have."

But it is their approach rather than their answers which is important. The behavioral sciences seek understanding through systematic research. They are not seeking immediate answers, but are raising questions which will lead to significant research effort. Once we are able to rid ourselves of the notion that we must have answers, we can begin to look around for research techniques and research approaches and begin to act like scientific educators in a truly applied science in business enterprise, organization, and administration.

While there is only one science of human behavior, there are different approaches. Economics, the oldest and perhaps the most highly developed of the human sciences, concentrates on certain segments of human behavior and seeks understanding through the application of various systematic models. Sociology is more empirically concerned with the behavior of man in terms of cultural, organizational, and group influences. Psychology concentrates on the inner-man and is experimentally oriented. Biology is concerned with the nature and processes of living organisms and contributes to our understanding of the human organism as well as complex organic systems such as human organizations. All of these fields overlap, separated only by osmotic membranes. None of these fields has an exclusive patent on the scientific method or on the techniques of understanding human behavior. Thus the applied fields have as much right to use these methods in their research efforts as the pure fields. We can borrow from any or all of them and make up a few approaches of our own. We are primarily interested in an interdisciplinary study of business enterprise, organization, and administration. As such, we are able to borrow from the basic human sciences and may even contribute something to them.

THE TRIPOD OF BUSINESS ADMINISTRATION

The three legs on which the business administration program stands are economics, the behavioral sciences, and the ubiquitous science, mathematics. Because we stand on these three legs does not mean that the curriculum of the business school is simply a combination of economics, behavioral science, and mathematics. All of these approaches must be integrated around significant, applied areas of business enterprise, organization, and administration. How much of the purer sciences are needed by our students pretty much depends on what prior knowledge of these fields is required in order to cope intelligently with our courses. Under any circumstance, however, we can state categorically that our students should not need applied courses in these other fields. They're going to have enough application in the business school. What they need is the best that can be offered in terms of *the theory, the method, and the significant body of knowledge* of the purer social sciences. There is nothing that is more wasteful of the business student's time than

taking a course in human relations in the business school, two courses in the psychology of human relations in the psychology department, and topping it all off with a course in industrial sociology.

BRINGING IN BEHAVIORAL SCIENTISTS

What about behavioral scientists in the business school itself? Naturally, I'm for it, but, again, I'm for the approach and not especially for the body of knowledge which behavioral scientists bring into the business school. Behavioral scientists, like economists or mathematicians, however, have to be used effectively in our business schools. I can tell you what not to do. First, don't bring in a behavioral scientist as Exhibit A, who goes on doing research unrelated to business. If he is not committed to the study of business and the teaching of business, leave him in his original department. Second, don't bring in only one behavioral scientist in a particular field. Bring them to the business school in combination so that they have someone to talk to in their own field—at least until they are integrated with your faculty. Third, don't use a behavioral scientist in a business school simply for the purpose of developing an appreciation of the behavioral sciences among your students. If you can't use him more directly than this, you are wasting his time and squandering your money.

All of these admonitions suggest what might advantageously be done in introducing behavioral scientists into business research and teaching. First, do get him involved in research, particularly in research which involves business faculty. Second, do get him involved with curriculum planning, particularly at the level of conceptualizing significant areas of study which are likely to stimulate research at various levels. Third, do get men who are thoroughly committed to business teaching and research and regard this applied field as a truly significant area rather than simply a hide-out from the rigidities and restrictions of his own field. And, finally, do bring enough of them in so that they have an impact on the school, that they don't themselves die of anomie, and that they are able to make the contributions which our business schools merit.

I believe, then, that the scholarly approach of the purer sciences should be integrated directly into the business schools so that it becomes part of its normal climate, not only in terms of research but in student-professor relations as well. I believe also that such an integration will hinge upon a new conceptualization of the role of the business school as an applied social science. And this will be reflected in new curricula, which, in turn, will reshape the interests and orientation of business professors. When such a reshaping of faculty interests and orientation occurs, we will be in a more adequate position to assess the preparatory work required of business students in the purer sciences. In the meantime, such outside work should be regarded as contributing primarily to the broader education of the student.

Applying the Scientific Method to the Study of Management

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The disparagers of management as a body of knowledge[1] are many. They range from the practicing executive who "knows" that the management process is one which defies analysis to the group of academicians which criticizes management because of its "non-scientific" basis. While the executive may easily contradict himself by calling in a firm of consultants to analyze his business problems and properly apply management fundamentals, the academician is more difficult to answer effectively. Such an academician argues that the grouping of management concepts into a body of knowledge is a useless endeavor at present because these concepts have not been proved: at best they are speculation, at worst they are erroneous *a posteriori* analysis.

It is true that speculation and propositions erroneously arrived at through a "reconstructed hindsight" process abound in management literature. But at the same time a core of subject matter exists which purports to be the beginning of the body of knowledge. This core finds its proponents in the school of Fayol,[2] Taylor, Mooney, Koontz and O'Donnell, and others who hold fast by the "principle" approach, which contends that there are truths of management and that these truths are universally applicable.

When the battle ground is drawn between the academicians who disparage management as a science and those of the "principle" school, it becomes apparent that the attack and defense center around the scientific proofs of the body of knowledge and the applicability of its principles. It might be well, therefore, to review some of the difficulties in approaching the management process via the scientific method and also to comment on the universality of principles.

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[1] In regard to the definition of management as a body of knowledge, see Lyndall Urwick, "The Problem of Management Semantics," *California Management Review*, Vol. II, No. 3 (1960), pp. 77-83.

[2] H. Fayol, *General and Industrial Administration* (London, Sir Isaac Pitman & Sons, Ltd., 1949); F. W. Taylor, *The Principles of Scientific Management* (New York, Harper & Brothers, 1911); J. D. Mooney, *Principles of Organization* (rev. ed., New York, Harper & Brothers, 1947); H. Koontz & C. O'Donnell, *Principles of Management* (2nd ed., New York, McGraw-Hill, 1959). Specific principles referred to in this article are taken from Koontz & O'Donnell.

THE SCIENTIFIC METHOD

The scientific method consists of defining the parameters† of a problem, holding constant as many factors as possible, and then examining selected variables in the light of hypotheses which predict certain results. The hypotheses usually express causal relationships or in some way explain behavior. If the results occur as anticipated, with the hypotheses properly drawn, the hypotheses have been "proved" and the results can be repeated if the experiment is replicated.

When forced to use this approach,[3] the proponents of scientific management who contend that a body of knowledge does exist are immediately confronted with three obstacles:

1. The parameters have not been clearly defined.
2. The multiple variables are most difficult to hold constant as they exist, and if they are taken out of context they carry a risk of losing reality value.
3. The hypotheses have not been stated.

These obstacles underlie Ernest Dale's[4] appeal for the "comparative approach," and it is important to consider them for, if these obstacles are not overcome, the "scientific" basis for management has not been prepared.

THE PARAMETERS

The parameters that exist to date have been erected through suggestion or inference around general areas so large as to be meaningless in the conduct of experimental observation. Such broad limits as "all forms of human activity" or "things that get done through people" leave the investigator in somewhat of a quandary as to whether he should view small or large groups (mom & dad groceries

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†Editor's note: From a strictly technical standpoint the word parameter refers to a constant term in a mathematical expression or equation. For example, in the simple straight-line equation $y = a + bx$, a and b are constants, defining the parameters. Although it is true that a and b can assume *different* values for various straight-line equations, the values of a and b for a specific straight line are always *constant*. For example, in the straight-line equation $y = 3x + 5$, the 3 is always a 3 and the 5 is always a 5, whereas the *variables* x and y can take on an infinite number of values. (In the equation $y = 3x + 5$, 3 is the slope of the line and 5 is the value at which the straight line crosses the y-axis.)

As is the case with many other words, our advancing knowledge and interdisciplinary insight are bringing about a modification in the dictionary meaning of the term "parameter." In recent literary analysis, the meaning of the word parameter has, in some cases, been extended to include some qualitative as well as quantitative "constants": as in the case of Mr. Halff's usage of the term, the "givens" of the argument may include definitions, assumptions, delimitations, constraints, and even environmental conditions and values—either of a purely parametric or other exogenous (external-*variable*) type.

[3] The phrase "forced to use this approach" is used here because I do not believe that managers or proponents of management principles voluntarily choose this involved Positivistic method; it is too slow for them, and they have "proof" enough that the "principles" work from their own considerable and practical experience. However, if one is to lay the foundations for a science, it is best to do so in an acceptable manner, and, even though unstructured practical experience may be sufficient for the test of day-to-day activity, it is not adequate for the abstractive academic process. This is a meaningful and difficult challenge, but the management proponent must follow the academician's rules, rather than deny the ground and refuse the defense.

[4] Ernest Dale, "Some Foundations of Organization Theory," *California Management Review*, Vol. II, No. 1, (1959), pp. 71-84.

or General Motors), profit-motivated business or non-profit concerns (Boeing or RAND), and so forth. Where should the investigator start, and what should he exclude? And can he expect identical outcomes in applying principles to the *New York Times* staff and to Coca Cola Bottling Company's personnel?

What is needed here—at least at first—is the staking out of some definite and reasonable area. Although it is not within the scope of this article to define the area, it would seem that the most productive subjects for study at this stage are the small organizations of from 200 to 500 employees. Other dimensions, such as activity, purpose, time periods, location, cultural perspective, and the like should also be identified and clearly stated.

THE VARIABLES

After the problem area is narrowed down to something that can be observed, there is the obstacle of uncontrollable variables in a dynamic environment. If the environment is artifically concocted, the study may very easily lose its meaning. For example, how realistically can the long hours and the pressure and pace of decision-making in the automobile industry be duplicated in the classroom or workshop? But this should not prevent observation in industry (as done by Zaleznik and others[5]) or preclude clever approximation of the actual occurrences (such as was devised by Chapman[6] in the RAND experiments). The important consideration is that some attention be directed to identifying the variables and taking them into account. Attempts to isolate the variables, though admittedly difficult, are usually fruitful at least to the extent of identification and a consideration of their influence.

THE HYPOTHESES

Even after the problem area has been defined and some of the variables have been nailed down, formulation of the hypotheses remains. This is, perhaps, where the bulk of the work is needed. *If the "principles" developed to date actually do explain behavior or do express a causal relationship, they must be re-worked into a form that anticipates the result of their application.* There is, of course, already an implied hypothesis in the formulation of most "principles," namely, that if such and such a principle is applied to the problem—with other factors held constant, and so forth—then a "good" result will obtain.[7] This in turn raises the question of the criterion for measurement of "good" as well as other test considerations, such as validity and reliability. It is indeed a difficult question, but one which must be faced if we are to use the scientific method in studying management.

Certainly the area for disagreement regarding such a criterion is larger than

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[5] A. Zaleznik, C. R. Christensen, F. J. Roethlisberger, and G. C. Homans, *The Motivation, Productivity, and Satisfaction of Workers* (Boston, Harvard Business School, Division of Research, 1958).

[6] R. L. Chapman, Beil Kennedy, and A. Newell, *The Systems Research Laboratory Air Defense Experiments* (Santa Monica, The RAND Corporation October 23, 1957), Report P-1202.

[7] Or at least a "better" result than would have obtained if not applied.

that for agreement, but I should like to suggest three possible criteria that appear relatively non-controversial as starting points:

1. Efficiency (The ratio of output to input)
2. Survival of the organization in movement towards its objectives
3. Morale of the members of the organization

The first two are quantitative facts of existence—although the first, in particular, may also present some conceptual problems of measurement. The third criterion is a qualitative value for the humanist.[8] I think that both a theorist, such as Barnard,[9] and a pragmatist, such as Tannenbaum,[10] may be able to find some common area here.

THE PRINCIPLES

As management "principles" move toward the hypothesis stage, many of them may have to be downgraded as merely convenient definitions or restatements of the problem's parameters. Although new hypotheses will have to be developed, it would seem that some of the present "principles" can be formed into hypotheses. The "principles" of unity of objective, the span of management (if properly stated), functional definition, planning flexibility, and similar fundamentals are among the likely candidates.

Outside of philosophical "first" principles, few principles achieve true universality. Establishing problem parameters should increase the applicability of truths within the defined area or "given set of circumstances."[11] But there will be exceptions, and these should not be cause for alarm. Even in the physical sciences the universality of principles may be regarded as "admitting of very numerous special applications, or exemplified in a multitude of cases."[12] In employing the scientific approach, it is expecting too much to hope for sweeping application in *every* specific case.

PROSPECT

After the three obstacles in regard to the parameters, the variables, and the hypotheses have been overcome—and the task does not appear to be gigantic—the experimenter is ready to enter into a test of the hypotheses. Here progress should be rapid.

The standoff that has existed in the past between the scientific management theorist and the academician who believes that management is not scientifically tractable may soon be resolved. If the preliminaries outlined herein are accomplished, I would predict an engagement, an adequate defense of many principles, and an acceptance of management's scientific basis by this "holdout" group of academicians.

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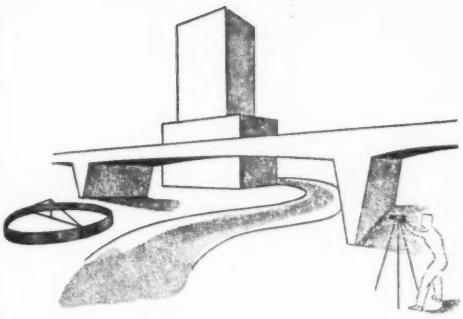
[8] During the summers of 1958-59 I conducted an informal experiment with two service groups in test of some of the principles of organization. Efficiency in terms of man-hours and materials and indicators of morale were observed. The criteria suggested were employed, and the results tended to substantiate the implied hypotheses.

[9] C. I. Barnard, *The Functions of the Executive* (Cambridge, Mass., Harvard University Press, 1938).

[10] I. R. Weschler, M. Kahane, and R. Tannenbaum, "Job Satisfaction, Productivity, and Morale: A. Case Study," *Occupational Psychology*, Vol. 26, No. 1, (1952).

[11] Koontz and O'Donnell, *op. cit.*, p. viii.

[12] "Principle," *A New English Dictionary of Historical Principles*, ed. by Sir James A. H. Murray, Vol. VII, Pt. II (Oxford, Clarendon Press, 1909), p. 1376.



Management in Perspective

THE PROBLEM OF EXECUTIVE MANPOWER INSOLVENCY

In the September issue of Dun's Review, Clarence Randall wrote that the balance sheet and the operating statement are hollow shells and mere mirages of the true strength of corporations. The certified public accountant has merely attested to their momentary apparent *financial strength*. Randall said that what we need is the CERTIFIED PERSONNEL ACCOUNTANT who can attest to their MANAGERIAL STRENGTH—if we are to know the possible future potency of an organization.

The average length of life of a corporation in the United States is only seven years. Our corporate system of industrial society is living proof of the fact that one must "lose his life to save it." The emergence of such business societies as the chain stores, co-operatives, voluntaries, manufacturer-owned retail outlets, and branch stores and the ever-present motivations for mergers which might be called "competitive compulsions to combination" bear witness to the fact that old methods of managing become obsolete in the face of new demands to lower unit costs.

The anti-trust laws, designed to preserve an Adam Smith-like type of miniscule firms in anonymous competition, are themselves responsible for the encouragement of larger and larger industrial complexes, since intensified competition requires the mobilization of greater and greater efficiencies and mobilized research, mobilized capital resources, and mobilized brain power. We are not permitted the relaxing luxury of gentlemen's agreements and orderly cartels that make it possible for my Latin American friends to share a given market without price cutting or aggressive invasion of each other's territories, thus permitting them the time really to be gentlemen and show consideration for their wives, their children, and their mistresses.

No. We are, instead, engaged in a great battle better to serve the consumer. Carrying briefcases home on commuter trains and burying our heads in a sea of papers, magazines, news bulletins, and the outpourings of the trade press, we are ever conscious of the pressure to promote and unload a given commitment of product models so as to reap a return on the invested *fixed* capital prior to its obsolescence. For, today, depreciation hardly has a chance. A machine is outmoded long before it is outworn.

The concentrated brain power in our technologically centered research organizations is pushing night and day to wipe out our assets in any given form and to

replace them with inventions that are outpacing the author of Buck Rogers. We are no longer in an era of plain and simple and pure and perfect competition such as Adam Smith wrote about in 1776. We have even gone beyond the era of "Handicap Competition," which in the 1930's emerged in the form of Fair Trade.

But man does not live by bread alone. In our unbelievable material success, we are demanding more and finer kinds of brain power—the challenge born of the need for men who can manage creatively in these new dimensions. Just as innovation has shifted competition to a level where it might properly be designated Innovistic Competition, so new challenges are creating new jobs. The re-writing of job specifications is itself the trap door through which experienced but non-innovative men are being written off.

The perilous state of our international relations shows on a global plane the need for new kinds of statesmanship. The threat of exclusion from the European Common Market is forcing domestic producers to take a second look at their interest in doing business abroad as overhead costs here are not lessened by mounting union demands in wages. Our own internal economy is far from healthy and demands minds that can think in new dimensions.

The Stealing of Executive Brain Power

One evidence of this need for such minds that can think in new dimensions is the raiding parties that are carried on as firms recruit each others' brain power. And now business is raiding our universities and stealing some of the outstanding faculty members from their classrooms. It takes a heap of dedication or stupidity to keep a job in a university today when industry holds out offers of three to five times the amount of compensation universities can afford. This may be what, in some cases, leads the business community to regard professors as "nincompoops" and to assume that they are only worth what they are getting or that if they refuse the opportunity for more, the offer was misplaced.

Yet many an executive has stated to me, personally, that he would like someday to enjoy the luxury of the academic life—when he can afford it. And it is indeed a rich life. The constant refreshment that comes from young, questioning, and eager minds, the excitement of joint discovery of insights and understanding, the significance of the adventure of the kind of living that is untarnished by discouragement and free from the inhibitions of knowing what is impossible—represents a truly rewarding life.

It is this stream of young, able, and eager minds that is now coming from the classroom into industry. Yet the stream is about to slow down to a trickle in comparison to the overwhelming demand for executive manpower.

Executive Manpower Insolvency

Not only are the executive ranks being decimated by the obsolescence resulting from changing demands, but the actual number of physical bodies available to man the dikes is dwindling due to the lack of births in the '30's. The age groups 25 to 44, which I like to call the responsibility-bearing age group for that wide band called "middle management," is limited to a total of 47 million bodies each year

for the next ten years. In that period it is expected that the gross national product of our country will double and the total population will rise to 230 million from its present high of about 185 million. There is a guaranteed shortage of manpower quantitatively and, from the standpoint of quality, the mounting demand for specialization means a shortage of men who can think across the board.

Already some firms are shifting their retirement age to 68; at the other end of the spectrum of management manpower, recruitment officers are visiting the campuses of our country, where they are searching out not only the graduating seniors and master's degree candidates, but are also talking to juniors and sophomores. Some are even providing four-year scholarships to outstanding high school students whom they've come to know as part-time employees.

Starting-Pay Statistics

Starting-pay statistics are blood curdling to someone like myself who graduated into the depression market and, because of the eminence of a master's degree from the Harvard Business School, was able to win the generous offer of $25 a week to start in making the world safe for retailing at Marshall Field and Company. At that time I owed Harvard $2,000 at 6% interest and tried to make it up by selling chinaware faster than the buyer could keep what I sold in stock. I learned then that it was better to sell the items he did have rather than the ones which were on order. But today, a wet-behind-the-ears graduating senior can command at least $400 a month; and an engineering student with a master's degree in business administration can get $750. This is not merely the difference resulting from inflation. It is ***demand.***

The Need For A Reservoir of Reflective Power

And so, as I look at the point raised by Clarence Randall regarding the need for a CERTIFIED PERSONNEL ACCOUNTANT who can attest to the managerial strength of a company, the issue of executive manpower insolvency takes on more serious implications. If companies are forced into competitive bidding against each other to get the kind and quality of executives needed at all levels—while opportunities may be enhanced for all individuals—it threatens the life of the firm as a whole unless there is a reservoir of reflective power, not only at the top but permeating the whole organization. Decentralization is calling for men of greater managerial capacities on all levels—men who can think in multiple dimensions to face up to the challenges of innovistic competition, men who can think of the interdependence of sales, finance, real estate, personnel administration, psychology, economics, production, and research.

There is a need today for men who can fuse into a new focus of relevance all the scattered fragmented bits of experience-taught wisdom, men who can perform the philosophical habit of thinking in terms of alternatives, men who can constantly stay alive to new ideas and seek new information and have the power of reflection. Training and developing men of such caliber is the surest foundation for avoiding the dangers of executive insolvency.

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WHAT IS SUCCESS?*

When I look out today 'midst earth's tumult and strife
And try to appraise the meaning of life,
I am met with this problem: How can I express
The meaning of life in terms of success?

Some answer money, some power to rule,
Some say it is knowledge acquired in the school,
Some say achievement, the work you perform,
Some conquering the tempest and riding the storm.

But none of these answers suffice to express
The things that I feel when I think of success.
When one speaks of success in this world filled with strife
He must of course first have a philosophy of life.

It is not what you do, not what is your task,
Not what kind of work—All you need ask:
Is it something worthwhile? Does it need to be done?
Not how hard is the race, but should it be run?

It is what you become, what your job does to you,
What service you give, what for others you do.
Choose and get, if you can, a job where you fit,
And then make yourself the master of it.

Remembering always that you need not lose
Though you can't get the job which at first you would choose.
It was Jesus who once said, as you may recall,
"He who would be greatest must be servant of all."

Do your best to serve all in whatever you do;
This much, He would say, is expected of you.
Success requires no one to do more than he can
But this much is required of every man.

Remembering always, let it be understood,
That you must do only what you think to be good,
And providing, of course, that your courage keep strong
To never do willingly what you know to be wrong.

You must learn that it's true and really believe
That it's more blessed to give than it is to receive.
Then, giving all that you have, in whatever you do,
In service for others, will bring success to you.

* The author is 94 years of age.

It is not what you do or get while you live
But what you become and the service you give.
Your doing and getting are but the process of living,
Your success is achieved in becoming and giving.

What kind of a person are you becoming each day?
What kind of a world will result from your way?
Answer these questions. Put yourself to the test.
By their answers alone can we measure success.

The above lines are a revision of those written in December, 1950 for my children for a family reunion, giving to them an expression of my philosophy of life.

M. M. WANT
509 W. Nevada Street
Urbana, Illinois

February 19, 1960.

Academy Of Management

News and Notes

The Twentieth Annual Conference of the Academy of Management will be held on Wednesday, December 28, 1960 in Room 111, Louderman Hall, on the beautiful campus of Washington University, St. Louis, Missouri. (See picture on page 205.)

The following interesting program has been arranged by Professor George Terry, of Northwestern University, Vice President and Program Chairman of the Academy of Management:

8:30 A.M.

Women's Building Lounge,
Washington University,
St. Louis, Missouri

Registration

8:50 A.M.

Louderman Hall 111,
Washington University

Greeting

Joseph W. Towle, Professor of Management, Washington University and President, Academy of Management.

Arthur Mason, Jr., Acting Dean, Graduate School of Business Administration, Washington University, St. Louis.

9:00 A.M.

CONTRIBUTIONS TO MANAGEMENT PHILOSOPHY FROM THE BEHAVIORAL SCIENCES

Panel Discussion

Moderator, John F. Mee, Professor and Chairman, Department of Management, School of Business, Indiana University.

Nick Demerath, Professor of Sociology and Director of the Social Science Institute, Washington University, St. Louis.

David G. Moore, Professor and Head of the Department of Personnel and Production Administration, Michigan State University.

Hear an eminent sociologist and an expert in human relations discuss management philosophy and the behavioral sciences.

10:30 A.M.

NEW CONCEPTS AND DEVELOPMENTS IN ORGANIZATION

Panel Discussion

Moderator, Alvin Brown, retired, formerly Vice President for Finance, Johns-Manville Corporation, New York.

Albert H. Rubenstein, Professor of Industrial Engineering, The Technological Institute, Northwestern University.

William E. Schlender, Assistant Dean, College of Commerce and Administration, The Ohio State University.

Use of empirical studies of organizational behavior, field study techniques, and mathematical models in organization study will be included. Also modern concepts about a company's organizational unit, span of control, and decentralization.

12:00 Noon

LUNCHEON—Prince Hall, Washington University, St. Louis

A tasty luncheon for $2.50. Enjoy this social hour with other Academy members and guests.

1:00 P.M.

Louderman Hall 111, Washington University, St. Louis

MANAGEMENT AND RESEARCH

Address

Moderator, L. D. Bishop, Chairman, Department of Business Management, University of Oklahoma.

ROBERT F. STEADMAN, Vice President for Management Research, American Management Association, New York.

Academy research projects are sponsored by AMA. Hear its executive tell his views about research in the management field.

2:00 P.M.

TWO APPROACHES TO COMPUTER SIMULATION

Address

Moderator, Max D. Richards, Head, Division of Management, College of Business Administration, The Pennsylvania State University.

Kalman J. Cohen, Assistant Professor of Eco-

nomics and Industrial Administration, Graduate School of Industrial Administration, Carnegie Institute of Technology.

Professor Cohen, a winner of the 1960 Doctoral Dissertations Competition in Business Administration and Related Disciplines, sponsored by the Ford Foundation, will share his latest thoughts on computer simulation.

3:00 P.M.

MANAGEMENT WORK SHOPS

Group Participant Discussion Groups

Select the group in which you wish to participate. Meeting rooms will be announced at beginning of this session. After an hour discussion, all members will reconvene, and hear a five-minute summary from each group given by its respective moderator. This is your opportunity to discuss with contemporaries one of your favorite management subjects.

GROUP A:

UNIVERSITY MANAGEMENT EDUCATION IN FOREIGN COUNTRIES

Moderator, Egbert H. van Delden, Professor of Management, Graduate School of Business Administration, New York University.

Typical Questions:

1. How does university management education in foreign countries differ from that of the United States?

2. What is the relative status of the management professor in foreign countries?

GROUP B:

MANAGEMENT AND PROFESSIONALISM

Moderator, Thomas J. Luck, Executive Assistant, State Farm Mutual Automobile Insurance Company, Bloomington, Illinois.

Typical Questions:

1. Is the practice of management a profession?

2. Should examining boards be established in management?

GROUP C:

THE USE OF GAMES IN MANAGEMENT DEVELOPMENT

Moderator, Norman H. Deunk, Manager of Management Development, International Business Machines, Inc., Chicago.

Typical Questions:

1. Are decision-making games truly a simulation of the business situation?

2. Do specialized or generalized games produce more effective results?

GROUP D:

THE MANAGEMENT CURRICULUM AT THE UNIVERSITY LEVEL

Moderator, Kenneth H. Myers, Professor and Chairman, Department of Production and Operations Management, School of Business, Northwestern University.

Typical Questions:

1. What should be the objectives of a management curriculum at the university level?

2. What curriculum changes have been made by your school since the Gordon and Howell Report?

GROUP E:

RECENT DEVELOPMENTS IN HUMAN RELATIONS

Moderator, Thomas R. Bossort, Jr., Associate Professor of Management, School of Business, Indiana University.

Typical Questions:

1. Can human relations be taught effectively in the university?

2. What is the strongest aspect of current collegiate instruction in human relations? The weakest aspect?

4:30 P.M.

BUSINESS MEETING

Stay for this meeting. Important Academy business will be transacted.

SPECIAL ACTIVITIES

All Academy members are cordially invited by St. Louis University to participate in this preliminary program:

Time:

Tuesday afternoon, December 27, 1960

Place:

Pius XII Memorial Library
3655 West Pine Street
St. Louis, Missouri

Program:

2:00 P.M.

Pre-registration for members of the Academy of Management.

2:15 P.M.

Guided tour of the new and beautiful Pius XII Memorial Library of St. Louis University. This library has much of the Vatican Library on microfilm.

3:00 P.M.

Meetings of Academy of Management Committees. You are cordially invited, whether a member of a committee or not. Groups included are Finance, Membership, Nominations

and Elections, Program, Public Relations, Research and Publications Committees, Officers of the Academy, and the Board of Governors.

HOTEL RESERVATIONS

St. Louis has many excellent hotels. The following are convenient to the meetings:

Ambassador Hotel
Chase Hotel
Congress Hotel
Coronado Hotel
Gatesworth Hotel
Park Plaza Hotel

Write directly to hotel for reservation and rate.

The Western Chapter of the Academy of Management is holding its annual conference in Monterey, California on April 14 and 15, 1961. The Naval Post Graduate School is the host institution. The program committee is as follows:

Harold Koontz, University of California at Los Angeles
George Steiner, University of California at Los Angeles
William Wolfe, University of Southern California
Carleton Pederson, Stanford University
William Vatter, University of California at Berkeley
Villiam Voris, Los Angeles State College

The panels to be presented include approaches to organization theory, approaches to production management, the application of the behavioral sciences to personnel management, and the academic preparation of management professors.

The Fourth Annual Midwest Management Conference will be held in the University Union, Bowling Green State University, Bowling Green, Ohio on Friday and Saturday, April 28 and 29, 1961. An announcement and request for program suggestions has been mailed to all who were registrants of the conference held at Wayne State University this past year. Inquiries and suggestions should be directed to Professor Robert D. Henderson, Chairman, Department of Business Administration, Bowling Green State University, Bowling Green, Ohio. Additional details will appear in a later issue of the *Journal*.

The annual meeting of the American Economic Association will be held on December 28–30, 1960 in St. Louis, Missouri. The headquarters hotels for this meeting are the Chase-Park Plaza Hotels in St. Louis.

Chairman of the committee on local arrangements is Dr. Homer Jones, Federal Reserve Bank, St. Louis, Missouri.

Professors Dalton E. McFarland, of Michigan State University, and Earl G. Planty, of the University of Illinois, have been elected Fellows of the Academy of Management. Fellows of the Academy are honored for their special contributions to management literature.

The annual meeting of the Fellows of the Academy of Management will be held at 4:30 P.M. on Tuesday, December 27, 1960 at the University Club in St. Louis.

The beautiful campus of Washington University, St. Louis, Missouri, which will be the focus of activities for the Twentieth Annual Conference of The Academy of Management. Joseph W. Towle, Professor of Management at Washington University, is President of The Academy.

Pennsylvania State University is revising its scheduling to four terms per year of ten weeks duration per term. Minutes per class are to be increased from 50 to 75, and the number of credits carried in three ten-week terms will be equivalent to that now obtainable in two semesters. It is a modified quarter system, in which students will receive semester hour credits rather than quarter hour credits.

The National Institute of Industrial Research will soon issue a new *Productivity Magazine* intended to stimulate general management interest in this subject. The new journal will focus upon a more up-to-date approach to problems of management and organization in industrial enterprises.

Scholarly contributions to the *Productivity Magazine* are welcome. Manuscripts should be addressed to: Mr. Antonio de Magalhães Ramalho, Director, The National Institute of Industrial Research, R. Garcia de Orta, 68, Lisboa 2, Portugal.

Professor Franklin E. Folts, who became Professor of Industrial Management, *Emeritus* at Harvard University effective August 31, 1959 and also serves as editorial consultant for the *Journal of the Academy of Management*, has recently reported the following:

> Starting this fall I have undertaken an activity that I anticipated would be exciting. Already it has proven to be so. As Educational Director of the new Breech School of Business Administration at Drury College, Springfield, Missouri, I find myself associated with a group developing a business administration educational program *within the framework of the Liberal Arts traditional objectives and disciplines.* The program has the sponsorship of Mr. Ernest Breech, until recently Chairman of the Board of the Ford Motor Company.
>
> Drury is a smaller Liberal Arts and Sciences college, long dedicated to the service of the broadly educated man and woman. Many of its graduates have had noteworthy careers as leaders in business and in a wide range of other fields. The current project addresses itself to the furtherance of these same objectives.
>
> Those engaged in the development of this program believe they are building a two-way bridge. Liberal Arts studies, when so oriented, can foster the development of many personal characteristics consistently found to be pervasive among more effective business administrators. Imagination, the desire to create, acceptance of, and adaptation to, change, perspective on tomorrow, and willingness to accept responsibility are typical of such attributes; and there are many others.
>
> Equally strong within the Drury group is the belief that a carefully structured program in administration (as applied in business activities) can broaden the development of non-business oriented students. At Drury there is strong conviction that courses in business management can be so taught as to contribute to social understanding, to broadening viewpoints, to making a beginning in the development of skills of leadership. These goals are of great importance to the liberally educated person who does not look forward to a career in business. It is the concept of this dual contribution of the Drury program that is so challenging—even exciting. I am finding my own association with the undertaking most rewarding, and I foresee much personal satisfaction coming from it. In writing this it is not so much news of myself that I wish to convey as it is to call attention to Drury and its unique undertaking. As the work unfolds, it well may uncover values and opportunities for institutions beyond the boundaries of the State of Missouri.
>
> With respect to my own activities, I continue my work on the faculty of the Harvard Business School doctoral program. Also, I serve Boston University as Consultant to its School of Business Administration. Obviously, I am busy; more importantly, I am happily so.

Employee bonuses are disappearing. In fact, there's a good chance that the company bonus for employees will soon become "as rare as the Dodo bird," according to Industrial Relations News, weekly newsletter for the industrial relations personnel prefossion. Only 12 of 23 companies checked by IRN hand out bonuses of any kind. And 3 of the remaining 11 just recently crossed all bonus plans off their books.

Across-the-board bonuses are a "waste of money," confesses the personnel director of a large publishing firm. He reports eliminating the Christmas bonus plan because employees sneered at the $20 given to all employees. The company replaced the bonus with major medical insurance.

Bonus plans may boomerang, warns the personnel chief of a large construction firm. Joseph W. Gilmartin, personnel director of Chemical Construction Corporation, New York, explains that employees view bonuses as "something coming to them," rather than as a reward for job performance.

Professor Paul Dauten, of the University of Illinois, is resigning his position as Editor-in-Chief of the *Journal of the Academy of Management*. Starting with the new year, Professor Dalton E. McFarland, of Michigan State University, will be the new Editor-in-Chief. Professor Preston P. LeBreton, of the University of Washington, is Associate Editor of the *Journal*. Future manuscripts and correspondence pertaining to the *Journal of the Academy of Management* should be addressed to:

Dalton E. McFarland, Editor-in-Chief
Department of Personnel and Production Administration
Michigan State University
East Lansing, Michigan

William G. Scott has assumed the Chairmanship of the Management Department of De Paul University.

Mr. Ellis M. Derby, of Ridgewood, New Jersey, was appointed Assistant Personnel Officer of the Metropolitan Life Insurance Company by action of its Board of Directors on June 28, 1960.

Professor C. Edward Weber was promoted to associate professor at the University of Pittsburgh.

Effective with the November, 1960 issue, Professor John E. Burns, of De Paul University, is the new Editor of the *Industrial Management* magazine, published by the Industrial Management Society. Professor Burns is also continuing as Editor of the Labor and Industrial Relations department of the magazine and will continue to write the monthly feature on Labor and Industrial Relations.

Dr. Stanley J. Seimer, Chairman of the Production Management Department of Syracuse University, was promoted in May, 1960 to the rank of professor.

Professor Harold D. Koontz, of the University of California at Los Angeles, is on sabbatical leave for the fall semester 1960–61. He has been traveling extensively in the Orient, giving lectures in Japan.

Professor Cyril J. O'Donnell, of the University of California at Los Angeles, has spent some time at the Foundation for Productivity Research in Helsinki, Finland during the summer of 1960.

Dr. Sidney H. Phillips, formerly at Northwestern University, was appointed to the position of associate professor of production management in the Syracuse University College of Business Administration.

Professor Jacob Marschak joined the faculty of the University of California at Los Angeles on July 1, 1960 and is offering seminars in the economic theory of information and organization and is chairman of an interdisciplinary committee to establish a symposium on the use of mathematics in the social sciences.

Dr. Morris E. Hurley, formerly dean of the Syracuse University College of Business Administration, is at present teaching in Turin, Italy. He plans to return to the United States next summer. Dr. William Travers Jerome III is now dean of the College of Business Administration at Syracuse and Karl E. Vogt is assistant dean.

Dr. H. R. Neville, professor and director of continuing education services at Michigan State University, has been appointed visiting professor in the Departments of Economics and Management and Marketing at Louisiana State University for the first semester of 1960–61.

Professor Maneck S. Wadia is Ford Foundation Professor at the Administrative Science Center, University of Pittsburgh.

H. Edward Wrapp, of Harvard University, was promoted to Professor of Business Administration on July 1, 1959.

Professor Peter T. Swanish, of Loyola University, directed an unusual seminar for the International Co-operation Agency on July 6, 1960 at Loyola University on the problem of "Break Even: Return on Capital Used—Two Models for Management Decision Making." There were 12 members of a Japanese Kanto Regional Industrial Development Study Team in the Group, and two interpreters were used for the session, which lasted all day.

A number of attractive fellowships for advanced students and faculty members in the field of business administration has been announced by the Ford Foundation for the Academic year 1961-62. There is still time to apply for two of these, namely, Predoctoral Fellowships in Business Administration (closing date for applications, February 15, 1961); and Doctoral Dissertation Fellowships in Business Administration and Economics (closing date, February 1, 1961). Interested persons may contact the Fellowship Program in Economic Development and Administration, The Ford Foundation, 477 Madison Avenue, New York 22, New York.

Professor Rodney Luther, of San Fernando Valley State College, was Senior United States Consultant to the Mexican National Productivity Center during the academic year 1959-60.

Professor William G. Scott, of DePaul University, has been promoted to professor.

Thomas R. Masterson, Associate Professor of Business Administration, reports a change of address from De Paul University to the School of Business Administration, Emory University, Atlanta 22, Georgia.

Professor Pedro C. Leano has moved from Oklahoma State University to the College of Business Administration, Northeastern University, Boston, Massachusetts.

A. Richard Dooley, of Harvard University, was promoted to Associate Professor of Business Administration on July 1, 1960.

Professor Bruce E. DeSpelder, of Wayne State University, has just finished constructing a management game entitled, "Top Management Decision Management Simulation."

Professor Jacob J. Blair, of the University of Pittsburgh, is on a one year's leave of absence to engage in study and research on the philosophy of management.

While in Europe recently, Professor Franklin G. Moore, of the University of Michigan, bought a Fiat car, in which he and his family toured Western Europe.

Dr. Stanley King Walls, of Cresskill, New Jersey, has been elected a Fellow of the Royal Society for the Promotion of Health, London, England. The Society was formerly the Royal Sanitary Institute, but on the accession of Queen Elizabeth its name was changed to its present one. Election to Fellowship is strictly limited in number each year, and is in recognition of "noteworthy work for the promotion of health." The noteworthy work accomplished by Stanley King Walls was the modernization of the fishing industry on Gaspe, Labrador, and Newfoundland.

Professor Richard N. Schmidt, of the University of Buffalo, was in Scotland for ten weeks, from April 24 to July 2, having been appointed American Professor at the Residential Centre for Management Studies of the Royal College of Science and Technology for the 1960 summer term. Executives from all over the world attended sessions conducted by Professor Schmidt on the business use of electronic computers, operations research, and management statistics. Professor Schmidt also visited many computer installations in Scotland and England.

RESEARCH PROJECTS REPORTED IN PROGRESS BY ACADEMY MEMBERS

Professor Arthur M. Whitehill, Reynolds Professor of Human Relations in Industry at the University of North Carolina, has been in Tokyo since early June completing a summer research project concerning cultural values in motivation.

Professor Scott D. Walton, of the University of Oregon, is researching the records of the Great Northern Railway Company in St. Paul, Minnesota.

Dr. Ben Miller, of St. John's University, has just completed a research study for the American Management Association on human problems of automation. The study is concerned with the problems of resistance to change and makes recommendations for gaining acceptance for major methods changes.

Professor William R. (Jack) Spriegel and Dr. Edwin W. Mumma have three research projects underway, namely, supervisory training in human relations, mental health in industry, and merit rating of supervisors.

Professor Robert B. Fetter, of Yale University, is conducting a set of problem-oriented investigations into the planning of industrial service facilities which are characterized by variation in demand for service in terms of time between demands as well as duration of service. Materials handling service in a job order shop would be an example of this.

The basic objective is to develop a set of general analytical approaches to such problems, together with recommendations as to what constitutes an economic approach under given problem conditions.

Some of the problem-areas being investigated are maintenance, materials handling, operations of automatic or semi-automatic machinery, and hospital service facilities.

BOOKS REPORTED IN PROGRESS BY ACADEMY MEMBERS

A new 1248-page *Top Management Handbook* is just off the press. It is published by McGraw-Hill Book Company. The Editor-in-Chief is H.B. Maynard, President, Maynard Research Council, Inc. Sixty business leaders, from companies both large and small, are contributors to this volume which is priced at $17.50. Harold F. Smiddy, Vice President of General Electric Company and editorial consultant of the Academy's *Journal,* is author of Chapter 11 titled, "Deciding."

Professor Albert N. Schrieber, of the University of Washington, was project director and Professor Edward G. Brown, of the same University, was faculty team member for a study entitled, *The Attitude of Small Business Towards Defense Procurement Policies.* The report will soon be available to interested persons.

Professor Leo O. Thayer, of the University of Wichita, is author of a new book titled, *Administrative Communication,* which will be published on January 15, 1961 by Richard D. Irwin, Inc.

Preston LeBreton, Associate Editor of the *Journal of the Academy of Management* and Executive Officer of the Department of Policy, Personnel Relations, and Production at the University of Washington, is the author of *Planning Theory and Practice for Small Businesses,* to be published in 1961 by the Small Business Administration, U. S. Printing Office.

Professor Dale Henning, of the University of Washington, a member of our *Journal's* editorial board, is the author of *Non-financial Controls for Small Business,* scheduled for publication in August, 1961 by the Small Business Administration, U. S. Printing Office.

Professor Richard N. Schmidt, of the University of Buffalo, is finishing a book on the business use of the computer from the executive point of view.

Professor Robert B. Fetter, of Yale University, is working with Ned Bowman on a revision of their *Analysis for Production Management* text. It is scheduled for publication by Richard D. Irwin around March, 1961.

Professors Dale Henning and Preston P. LeBrĕton, both of the University of Washington, are co-authors of a forthcoming book on *Planning Theory*, which will be published by Prentice-Hall, Inc. in January of 1961. Dale Henning is a member of the editorial board of our *Journal*, and Preston LeBrĕton is Chairman of the Academy's Research and Publication Committee and associate editor of the *Journal*.

After one and one-half years of research and six months of writing, H. John Ross, of the Office Research Institute, is nearing completion of a manuscript for a new book tentatively titled, *How to Control Paperwork*. Publication is expected in February, 1961.

Professor Robert B. Fetter and Mr. Winston C. Dalleck are co-authors of a book titled, *Decision Models for Inventory Management*, which is being published by Richard D. Irwin toward the end of December, 1960.

Michael J. Jucius and William E. Schlender, of the Ohio State University, are co-authors of a new text, *Elements of Managerial Action*, which was published recently by Richard D. Irwin, Inc.

Teaching Excellence in Management is the report of a research team headed by Professor Judson Neff, of the University of Texas. This is a manual designed for young instructors teaching the core curriculum course in management titled Industrial Organization and Management. The study treats the structure of the core course, indicating the material to be covered and the depth of penetration desired in each subject area as well as the miscellany to be excluded. All material in Industrial Organization and Management is classified into five areas: personnel, time study, control, organization, and process. There is considerable detail on the limitations and use of the case method for the teaching of undergraduates.

William Voris, Head of the Department of Management at Los Angeles State College, is author of a new text, *The Management of Production*, published recently by The Ronald Press Company.

Phil Carroll, of Maplewood, New Jersey, has recently revised his book, *How to Chart Data*. The publisher is McGraw-Hill.

Professor Hans B. Thorelli, of the University of Chicago, is writing a book on organizations and environmental relationships. He is also working on the development of an International Operations Management Game.

Professor William J. Jaffe, of the Newark College of Engineering, and Dr. Lillian M. Gilbreth have co-authored, "Management's Past—A Guide To Its Future," which will soon appear in a new ASME book, *Fifty Years Progress In Management*.

Professor William M. Fox, of the University of Florida, is writing a new book on *Management*, which he hopes to finish by June of 1961.

Academy member Dean Austin Grimshaw, of the University of Washington, and John W. Hennessey, Jr., of Dartmouth College, are co-authors of a new book entitled, *Organizational Behavior—Cases and Readings*. The publisher is McGraw-Hill Book Company, Inc.

Professor William R. (Jack) Spriegel, of the University of Texas at Austin, is currently reading proof for the 6th Edition of *Personnel Management*, published by McGraw-Hill Book Company. The book is scheduled for publication in January.

Edwin B. Flippo, of Los Angeles State College, is reading galley proofs on his new book, *Principles of Personnel Management*, which is scheduled for publication by McGraw-Hill in March, 1961.

Professor Daniel Roman, of San Fernando Valley State College, is researching a book dealing with a theory regarding controls and planning. He and Professor Ira Levy have formed a professional controls and planning association known as CAPA. This is a highly specialized professional association of executives in the planning and controls areas.

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